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Dy.No. 2519/49-F.T.
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Food Industries

For those who control quality and costs through management and production—a McGraw-Hill publication

Three-lane sanitary conveyor carries poultry to and from eviscerating tables in advanced plant. (Story inside)

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SEE CHARTS INSIDE

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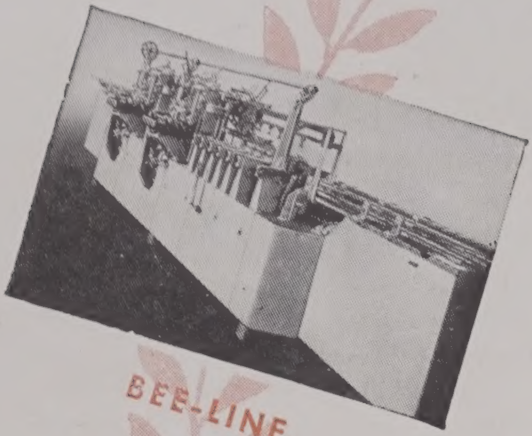
WORLD LABELERS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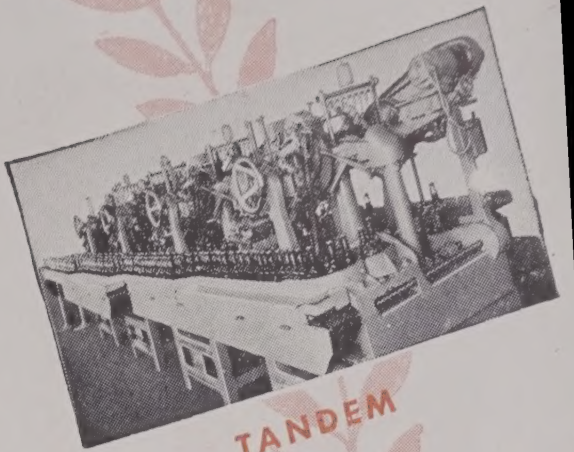
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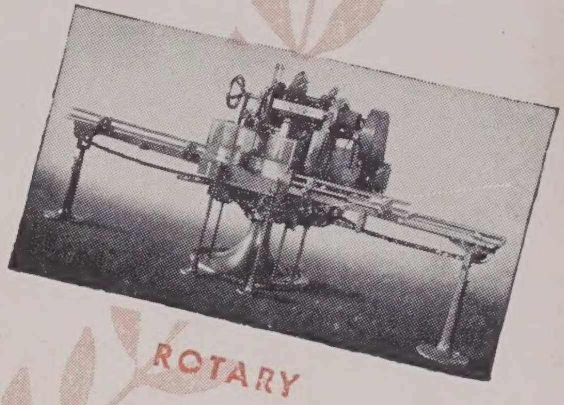
WORLD'S RECORD

for dependable, low-cost labeling helps you select the best Labeler in the WORLD for your purpose

TURRET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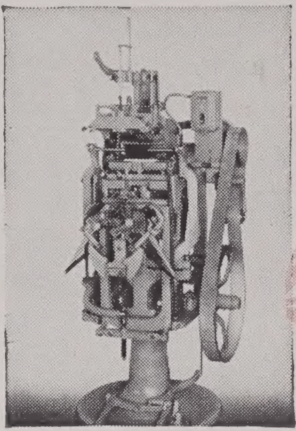
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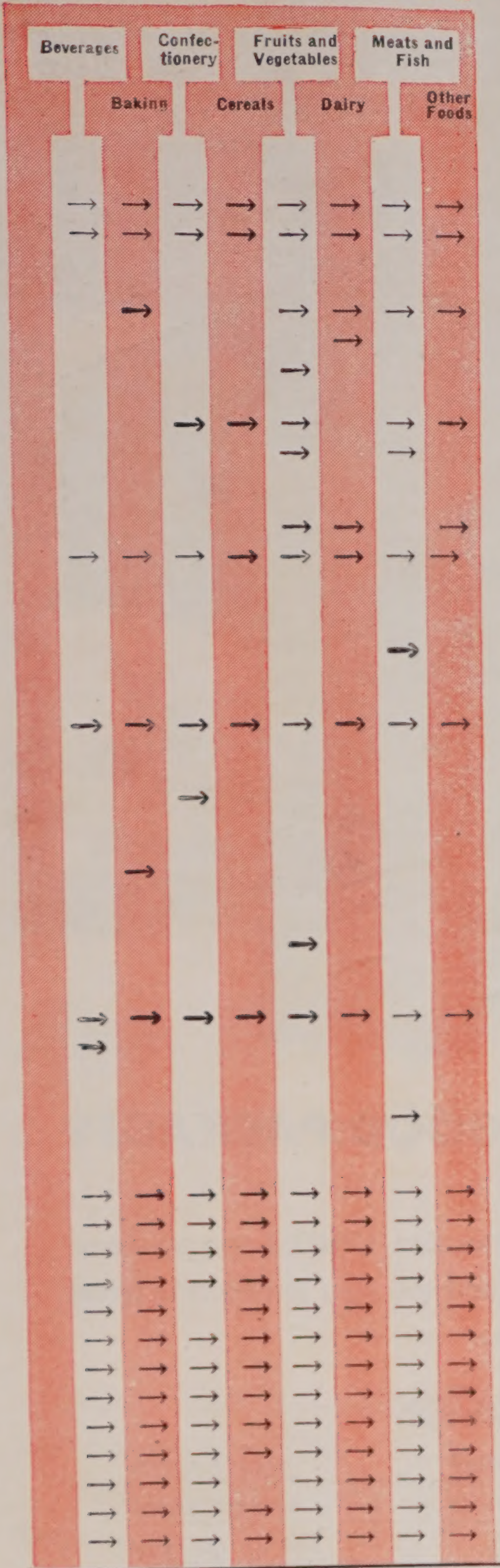

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PRICE: 35¢ per copy. Subscription rates: U.S. and possessions, $3 for 1 yr., $4 for 2 yrs., $5 for 3 yrs. Canada, $4 for 1 yr., $6 for 2 yrs., $8 for 3 yrs. (payable in Canadian or U.S. funds). Pan American Countries, $5 for 1 yr., $8 for 2 yrs., $10 for 3 yrs. All other countries, $15 for 1 yr., $25 for 2 yrs., $30 for 3 yrs. Indicate position and company on subscription orders. Subscriptions invited only from food processing executives, engineers, technologists, plant supervisors, consultants, laboratories.

EDITORIAL AND EXECUTIVE OFFICES: 330 West 42nd St., New York 18, N. Y. Cable address: "McGraw-Hill, N. Y." Address correspondence regarding subscriptions to J. E. Blackburn, Jr., Vice-President and Director of Circulation.

PUBLICATION OFFICE: 99-120 N. Broadway, Albany 1, N. Y. Entered as second class matter Aug. 26, 1948, at Albany post office under Act of Mar. 3, 1879. Return postage guaranteed. Member A.B.P. and A.B.C. Indexed monthly in Industrial Arts Index. Copyright 1949, by McGraw-Hill Publishing Co., Inc. All rights reserved.

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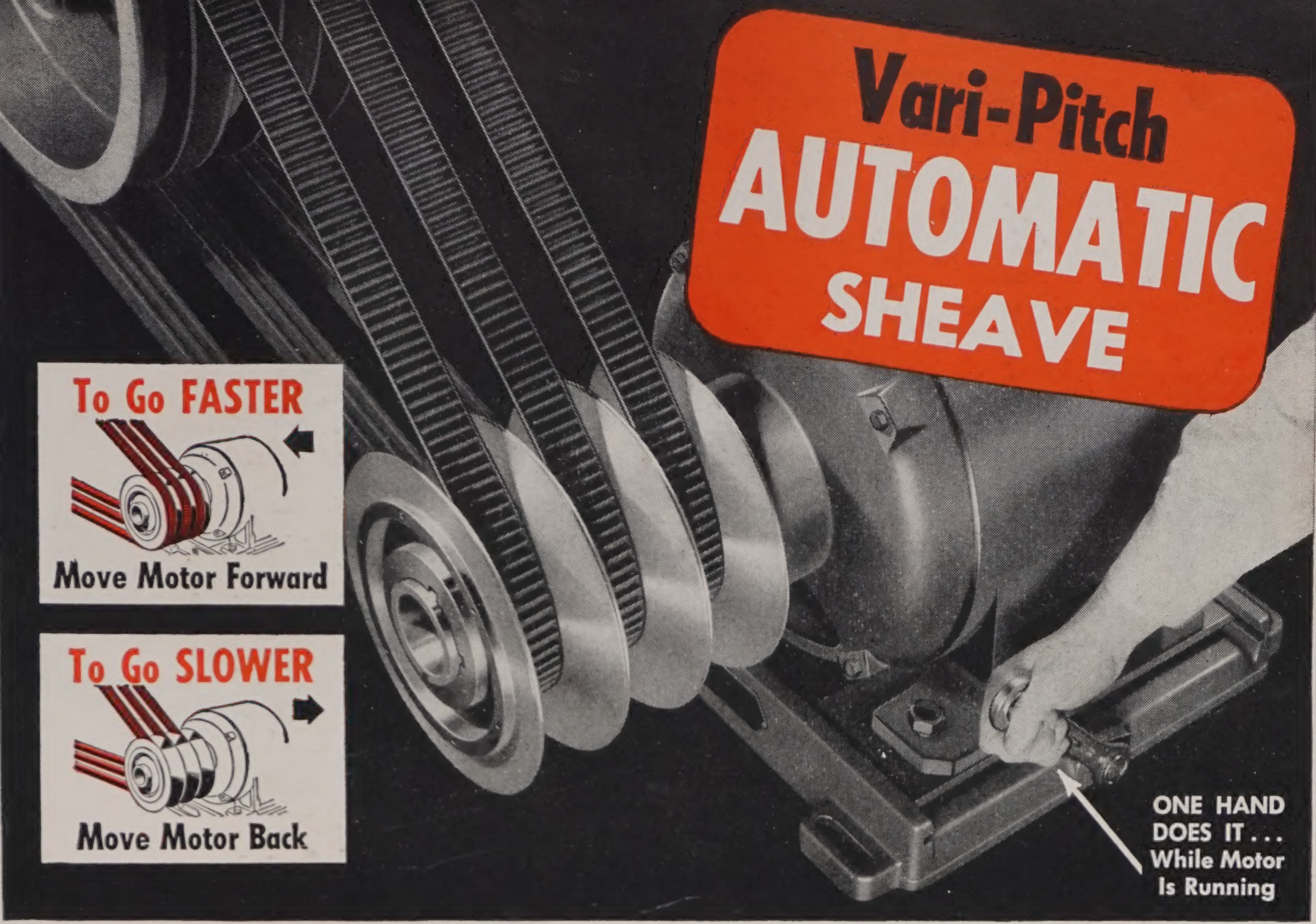

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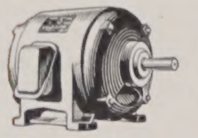

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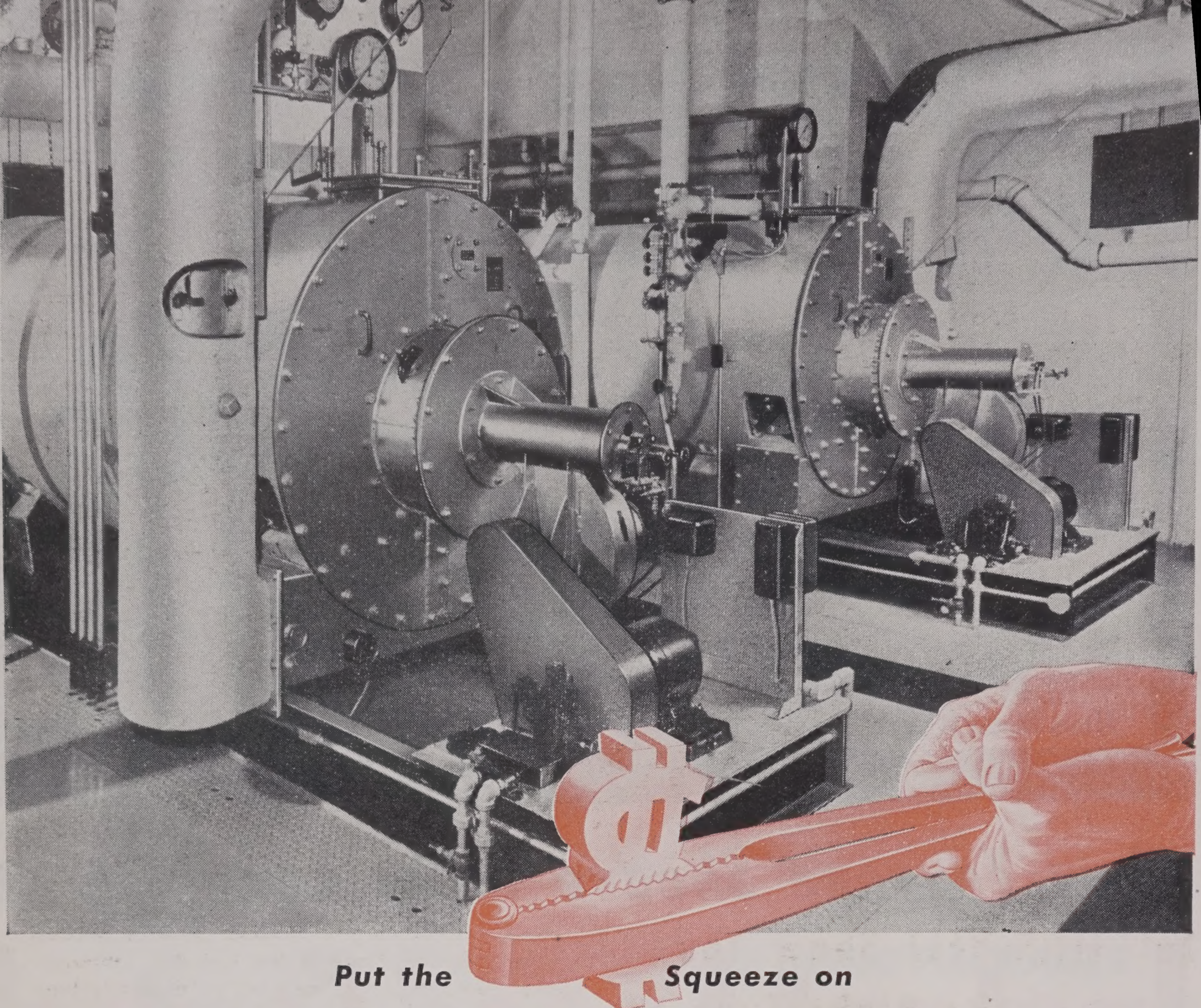

Put the Squeeze on

Steam Costs

NEVER forget boilers burn dollars — dollars that represent steam costs and a goodly share of your operating costs. Conditions today demand that you put the squeeze on steam costs along with your other costs. Begin with your boiler — investigate to see how much it is giving you for your fuel and operating dollars — see if it measures up in earning power as well as horsepower.

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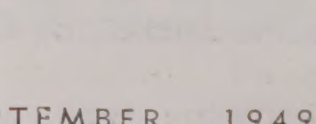

WRITE on your business letterhead for Steam Cost Calculator— a ready reference slide rule showing comparative steam costs when using oil, gas, or coal as fuel. Mailed on request — no obligation.

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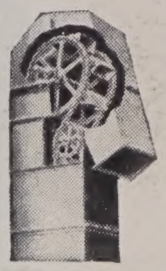
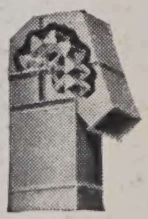
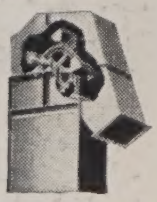
Got a Job for an Elevator?



Perfect discharge type—Slow speed, for materials which will not readily discharge at centrifugal speeds.



Continuous Bucket Type—High capacity at slow speed or for friable materials.



Centrifugal Discharge Type—Suits most products. Runs at Higher Speeds.

Let LINK-BELT Show You the Right Type of BUCKET ELEVATOR

Bucket elevators handle many different materials, under differing conditions, and for that reason, Link-Belt manufactures three major types of bucket elevators. For best results in handling any specific material be sure the elevator you choose has the required features.

For instance, there are loose, free-flowing materials which will not be harmed by a certain amount of dropping or tossing at high speeds. Ashes and coal are typical, and such materials can be handled satisfactorily with the centrifugal discharge type, running at high speed, with high volume.

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Link-Belt's vast manufacturing facilities and broad experience in all types of materials handling assure your receiving the most practical advice when you consult Link-Belt on any conveying, elevating or materials handling problem. Contact the office nearest you.

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Chain Conveyors
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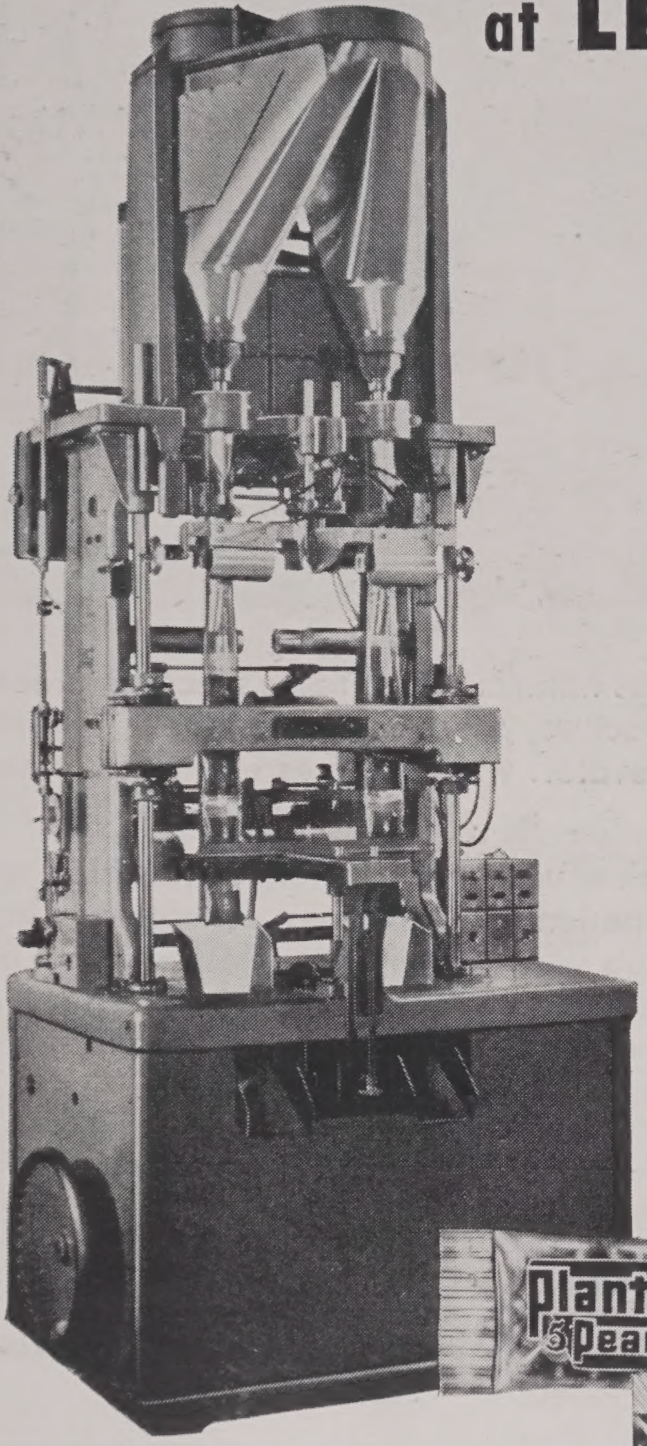

TRANSWRAP—industry's most practical and efficient packaging machine—forms, fills, seals and delivers a better-looking, better-selling package for your product . . . completely automatically.

In cost, the *finished filled* TRANSWRAP units actually run less than half the price of ready-made *empty* bags for manual processing. And, because a single operator can handle a whole battery of TRANSWRAP machines, wage savings are phenomenal.

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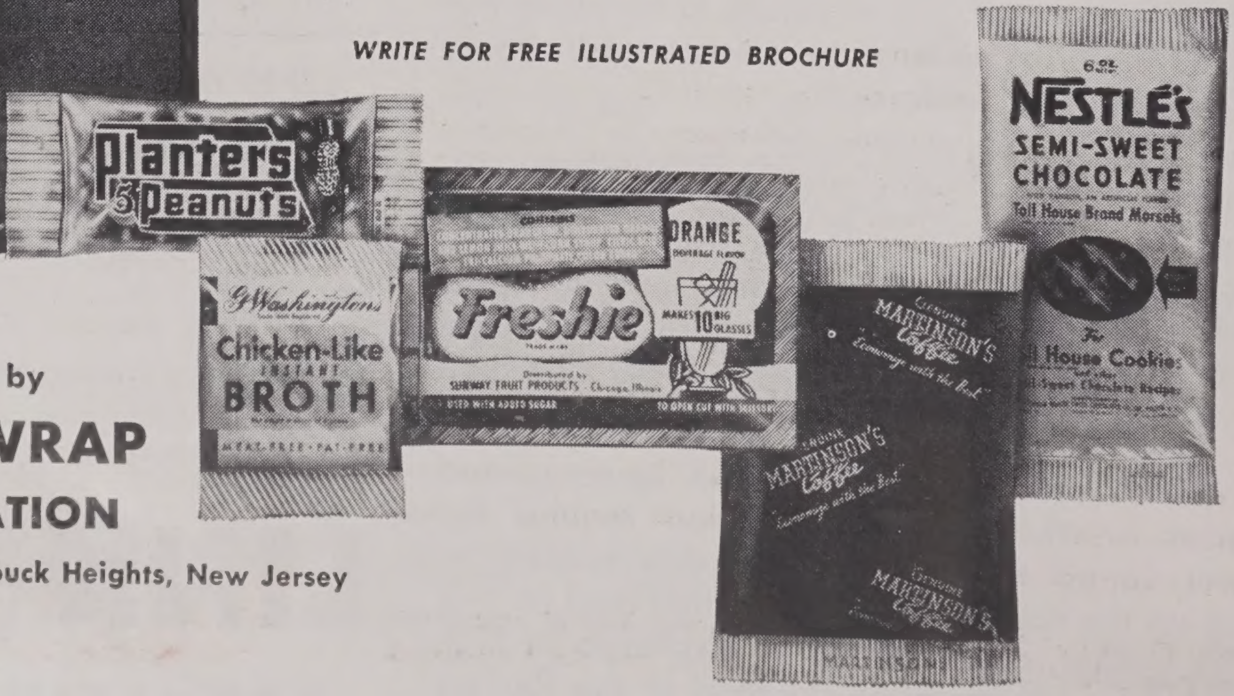

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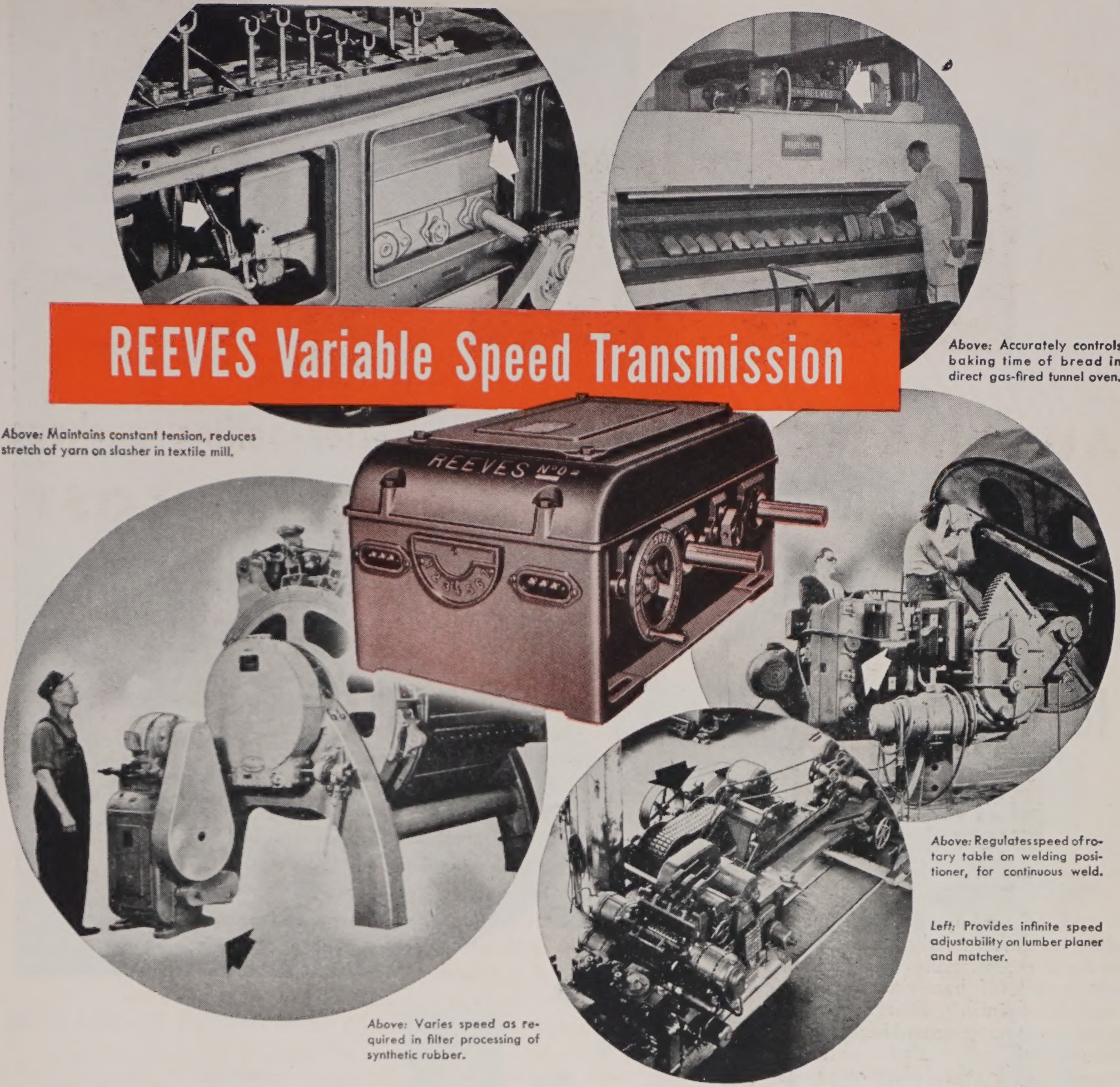

REEVES Variable Speed Transmission

Above: Maintains constant tension, reduces stretch of yarn on slasher in textile mill.

Above: Accurately controls baking time of bread in direct gas-fired tunnel oven.

Above: Regulates speed of rotary table on welding positioner, for continuous weld.

Left: Provides infinite speed adjustability on lumber planer and matcher.

Above: Varies speed as required in filter processing of synthetic rubber.

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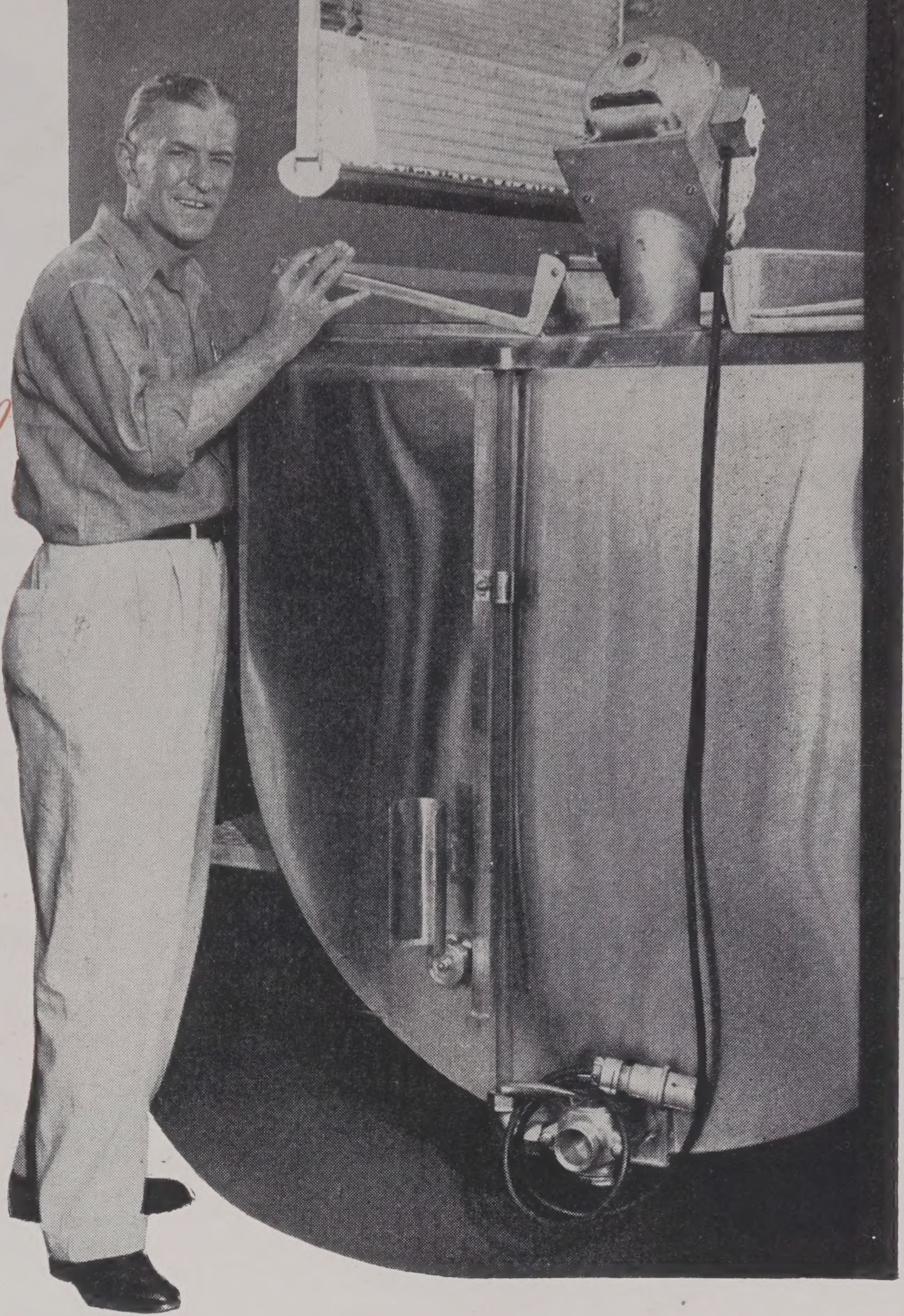

THE same qualities that make milk "the most nearly perfect food" make it exceptionally vulnerable to the attack of bacteria and other harmful organisms. Dairymen know there's one way to guard best against such attack, and that's to use Stainless Steel for every piece of equipment that comes in contact with the product.

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UNITED STATES STEEL

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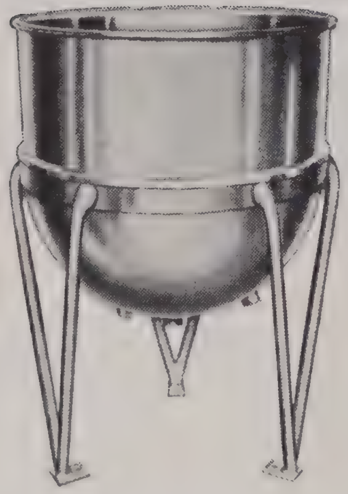
If you pack products which require kettles, fillers, percolators or emulsifiers, these 5 Pfaudler units give you competitive advantages which deserve investigation. Complete details on request.



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Heat transfer is remarkably fast due to quick circulation of steam through special Pfaudler inlet nozzle. When equipped with agitator (motor driven) and baffles, light to heavy liquids can be quickly mixed and heated without burning-on. Built to ASME code specifications, Pfaudler Kettles may be used for a wide range of operations. Available in 35, 65, 100, 150, 200 and 300 gallons. Three types: stationary, tilting and full jacketed.

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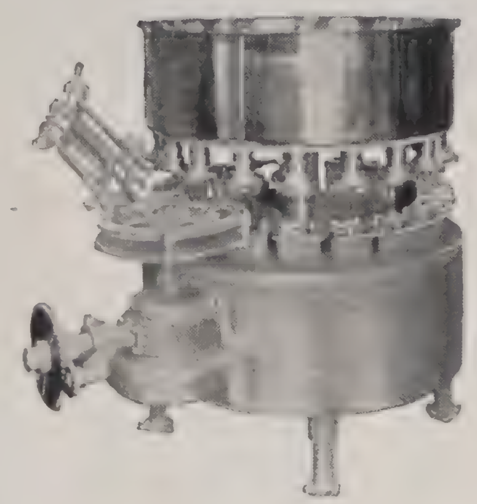

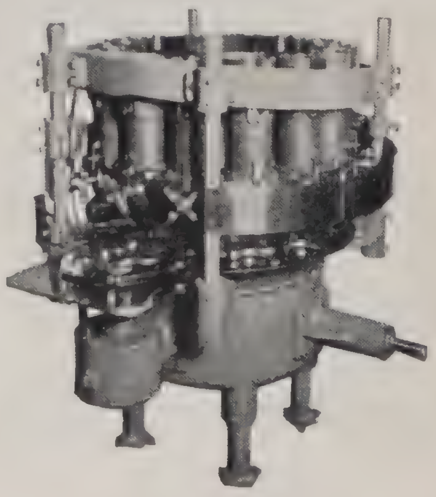

PFAUDLER EMULSIFIERS:

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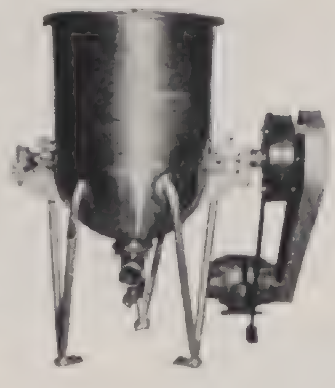
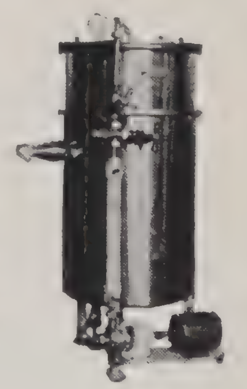


PFAUDLER PERCOLATORS:

These new stainless steel percolators circulate menstruum through the extractant under pressure which speeds up extraction. Filtration is carried on simultaneously. Heater in the re-circulating line applies controlled temperature to circulating menstruum, resulting in faster extraction. Second and third extraction can be obtained thus providing maximum yield from each batch.



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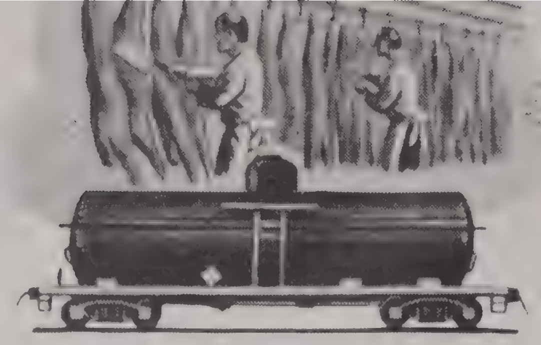
Glass-Lined Steel . . . Stainless Steels . . . Nickel . . . Inconel . . . Monel Metal

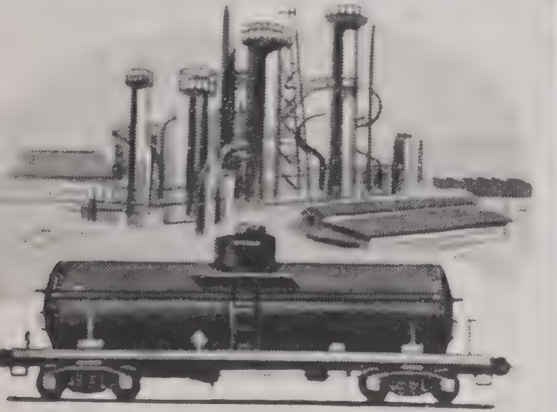
COTTONSEED OIL


LARD

LINSEED OIL

for bulk liquid shippers
GATX Tank Cars
offer safe, economical transportation

TANNIC ACID


CORN OIL

DESIGNED, BUILT
OPERATED and
MAINTAINED by

GENERAL AMERICAN
TRANSPORTATION CORPORATION

135 South LaSalle Street Chicago 90, Ill.

District Offices: Buffalo • Cleveland • Dallas • Houston
Los Angeles • New Orleans • New York • Pittsburgh
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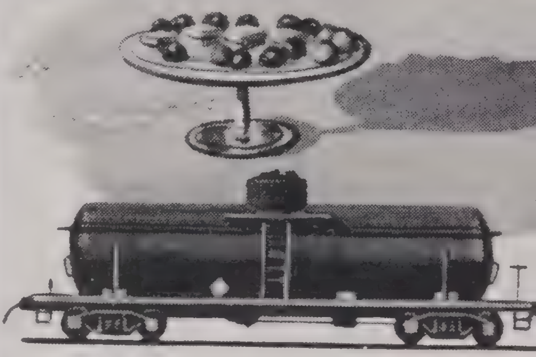
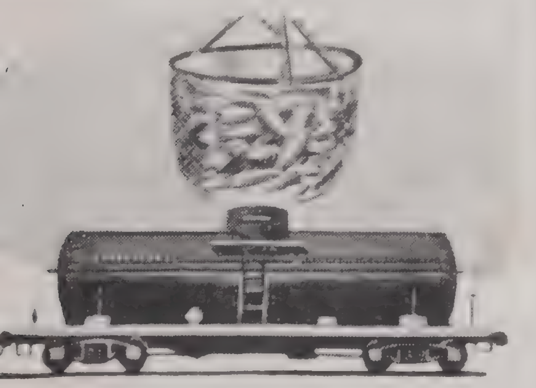
Export Dept., 10 E. 49th St., New York 17, New York

GATX GENERAL AMERICAN
TRADE MARK


CORN SYRUP UNMIXED

COCONUT OIL


FISH OIL

MOLASSES

TUNG OIL

EXIDE-IRONCLAD BATTERIES
ARE DIFFERENT!

They are specially designed to provide years of dependable service in all MOTIVE POWER WORK

Storage batteries are called upon to perform many tasks. No single type of battery is adequately suited to all. To meet these numerous requirements, Exide engineers have developed special types, to fit each application.* Among these several types is the specially designed Exide-Ironclad Battery. Details shown below.

VENT PLUG specially designed to prevent escape of electrolyte.

GREASE SEAL RING NUT holds battery elements securely in place . . . prevents creepage of electrolyte . . . keeps tops clean and dry.

SEALED CELL COVER flush with top of jar. Prevents collection of dirt or moisture . . . keeps impurities out of cell . . . eliminates leakage of electrolyte.

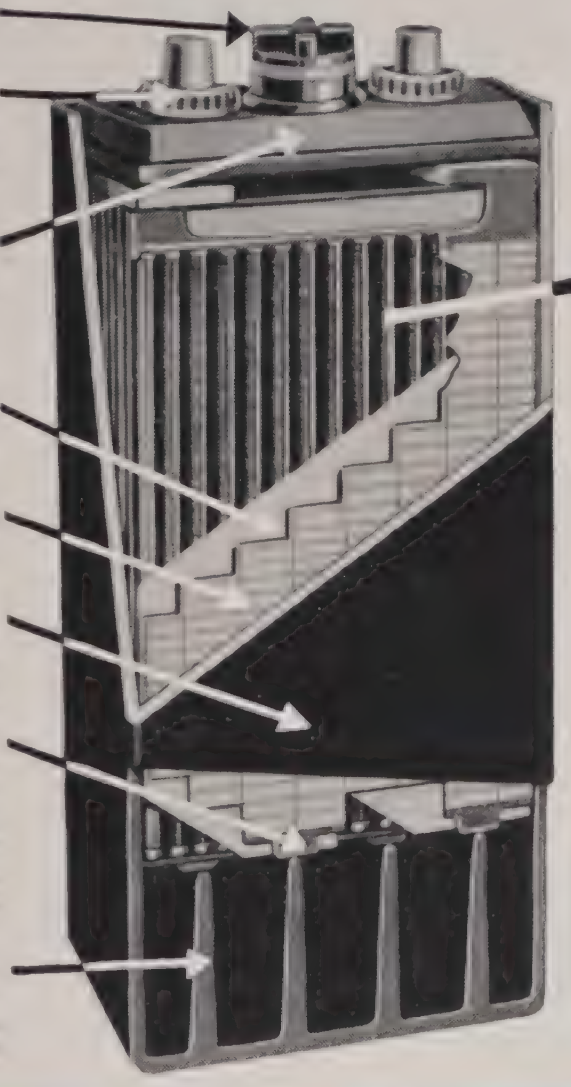
SEPARATOR of high porosity, specially treated to last the life of the battery.

NEGATIVE PLATE—made extra heavy and built to match the long life of the positive plate.

JAR made of specially tough and durable Giant Compound. Built to withstand the jolts and jars of hard industrial usage.

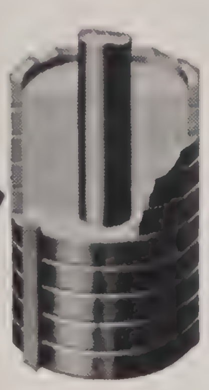
FEET. Internal short circuits practically eliminated because the two feet on negative plate rest on different ribs from those of the positive plate, and because separators extend below both plates and rest on all four ribs.

RIBS support all plates and separators. Their height provides generous sediment space so that internal cleaning is unnecessary.



DIFFERENT IN DESIGN
DIFFERENT IN CONSTRUCTION
DIFFERENT IN SERVICE QUALITIES

Chief among these differences is the unique positive plate, an exclusive Exide feature.



EXIDE-IRONCLAD POSITIVE PLATE

Consists of a series of finely-slotted tubes which contain the active material. So small are these slots that, while permitting easy access of electrolyte, they retard the active material from readily washing out or jarring loose . . . adding considerably to life of plate.

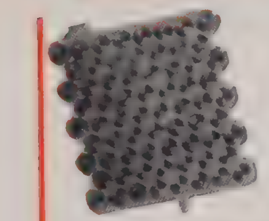
Exide-Ironclad Batteries have ALL FOUR of the characteristics that a storage battery must have to assure maximum performance from battery electric industrial trucks—high power ability, high electrical efficiency, ruggedness and a long life with minimum maintenance. The combination of these four Exide-Ironclad characteristics assures years of dependable day-in, day-out service.

DEPENDABLE POWER

Exide
IRONCLAD

"Exide" and "Exide-Ironclad"
Reg. Trade-marks U. S. Pat. Off.

*

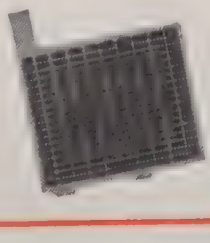


DESIGNED FOR STATIONARY USE

The Exide-Manchex Battery has the manchester type positive plate with the lead button construction. Specially designed for stationary use in many classes of industry.

DESIGNED FOR AUTOMOBILE USE

The Exide Automobile Battery has plates of staggered grid construction. Specially designed for use in automobiles, trucks, buses, aircraft and numerous other applications.

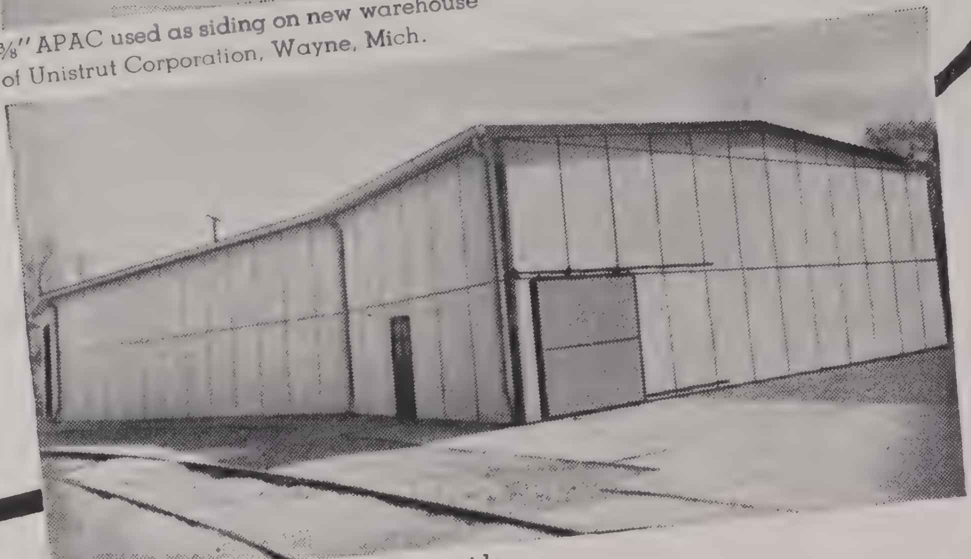


1888...DEPENDABLE BATTERIES FOR 61 YEARS...1949

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • *Exide Batteries of Canada, Limited, Toronto*

OUTSIDE AND INSIDE, TOO . . . IT'S K&M "Century" APAC

3/8" APAC used as siding on new warehouse of Unistrut Corporation, Wayne, Mich.



View of same building from opposite side.

In this new building of the Unistrut Corporation, Wayne, Mich., "Century" APAC asbestos-cement sheets were used both for siding and interior walls . . . where they can be counted on for a long life-time of dependable service.

"Century" APAC is the ideal material for industrial buildings of many kinds . . . both in new construction and remodeling. It is economical to use . . . easy to handle and apply, so goes up fast. It requires no protective paint, and maintenance is at a minimum. In fact, APAC actually grows tougher with age.

In addition to its use as siding and interior walls, APAC is extensively used for ceilings, office paneling, partitions, sheathing in machine shops and stock rooms, elevator shaft casings, storage bins and other flat surface applications.

Being made of asbestos and cement, APAC is fire resistant and proof against weather, rust, corrosion, rot, rodents and termites. It can be applied over insulation board, wood studs, solid wood sheathing, steel or wood girts. APAC is furnished in thicknesses of 3/16", 1/4" and 3/8". Standard size sheet is 4' x 8', but cutting to size is simple—just score and snap off.

Write for name of nearest distributor and further particulars. Your inquiry will receive prompt attention.

K&M best in asbestos

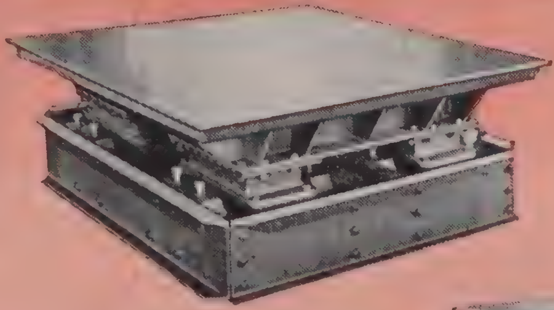
Nature made Asbestos . . . Keasbey & Mattison has made it serve mankind since 1873.

KEASBEY & MATTISON
COMPANY · AMBLER · PENNSYLVANIA

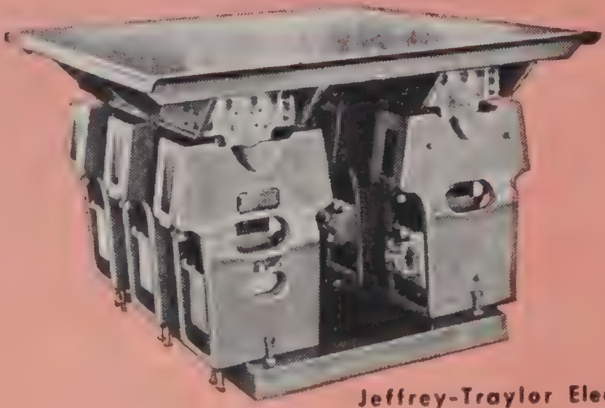
GET MAXIMUM RESULTS

IN PROCESSING AND PACKING OPERATIONS

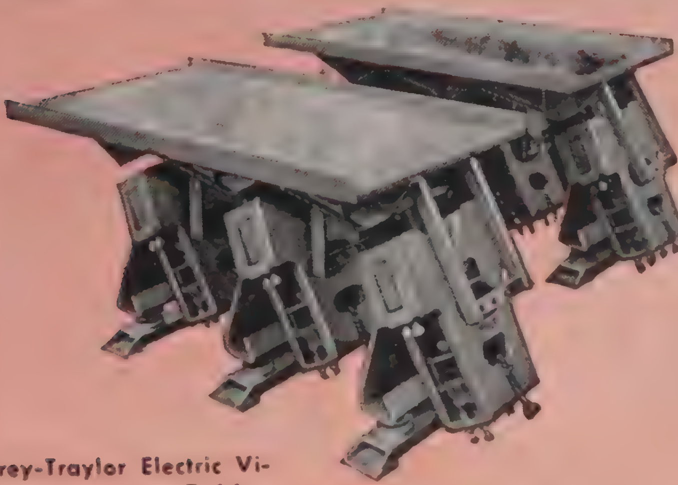
Typical installation of Jeffrey-Traylor Electric Vibrating Low Head Barrel Packer



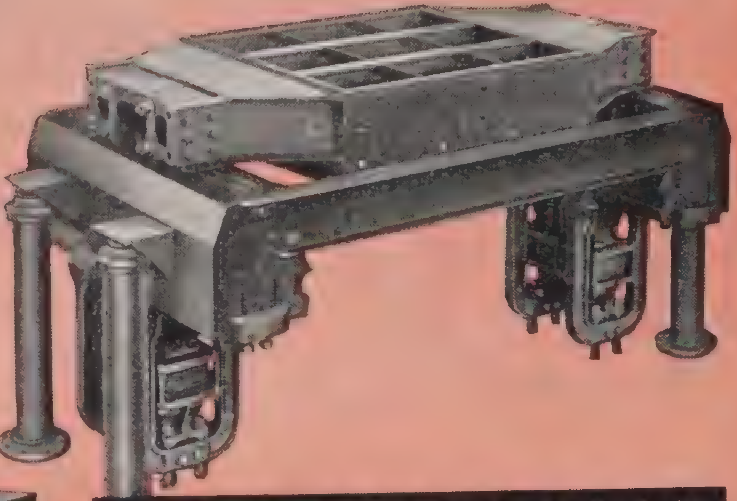
Jeffrey-Traylor Electric Vibrating Table for applying flock, fibres and hair



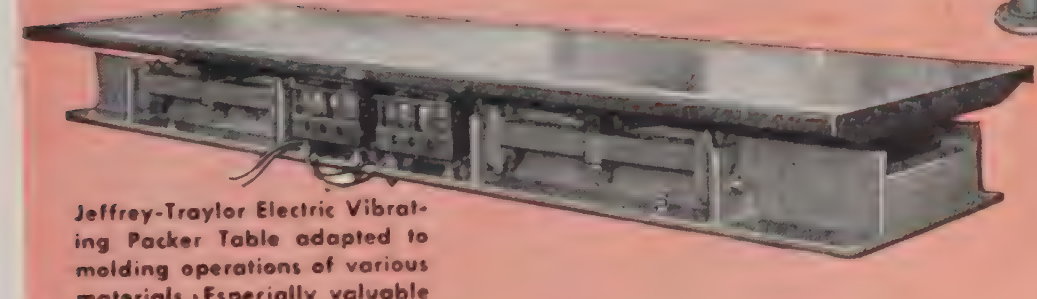
Jeffrey-Traylor Electric Vibrating Special Sparkproof Packer for applying flock to moving sheet



Jeffrey-Traylor Electric Vibrating Packer Tables which impart conveying motion to molds



Heavy duty Jeffrey-Traylor Electric Vibrating Grizzly Knock-out unit for removing plastic from barrels



Jeffrey-Traylor Electric Vibrating Packer Table adapted to molding operations of various materials. Especially valuable for settling molten chocolate into bar molds.

We will be glad to go into detail about the worthwhile economies to be obtained with the application of Jeffrey-Traylor equipment (Patented) to your processing and packing operations. In the meantime send for our new J-T catalog No. 750.

THE JEFFREY

MANUFACTURING COMPANY ESTABLISHED 1877

927 North Fourth St., Columbus 16, Ohio

Complete Line of Material Handling, Processing and Mining Equipment

Baltimore 1
Birmingham 3
Boston 16
Buffalo 2
Chicago 1
Cincinnati 2
Cleveland 13
Denver 2
Detroit 13
Harlan
Houston 5
Huntington 19
Jacksonville
Milwaukee
New York 7
Philadelphia 3
Pittsburgh 22
St. Louis 3
Salt Lake City 1
Scranton 3

PROTECTION AND *Beauty*

WHITE-TAILED DEER**
CANADIAN PORCUPINE*

KVP

PAPERS

For The FOOD INDUSTRY

INDUSTRIES SERVED

BAKING	MEAT
Bread - Cracker	*Packing - Locker*
Cereal	*Retail*

DAIRY

Butter - Cream - Cheese
Ice Cream - Milk

FISH - FRUIT - FROZEN FOODS
POULTRY - SHORTENING
VEGETABLE

Packaging procedure in any food plant calls for special protection papers.

KVP papermakers have long specialized in the right kind of protection for nearly all products of the food industry.

KVP artists and printers are masters at adding beauty and sales appeal.

We welcome a chance to pool our respective "know-hows" for the best possible packaging of your products.

*Slow of foot, dim of wit, the common Canadian porcupine (Erethizon dorsatus) survives because of the panoply of protective spears with which Nature has endowed him.

**The beauty and grace of the American white-tailed deer (Odocoileus virginianus) makes him one of the world's most lovely creatures. Both deer and porcupines are common in KVP's Canadian timberlands.

Kalamazoo Vegetable Parchment Company

PARCHMENT · MICHIGAN

ASSOCIATED COMPANIES: KALAMAZOO VEGETABLE PARCHMENT CO., DEVON, PENNA.
KVP COMPANY OF TEXAS, HOUSTON, TEXAS
HARVEY PAPER PRODUCTS CO., STURGIS, MICHIGAN
IN CANADA: THE KVP COMPANY LIMITED, ESPANOLA, ONTARIO
APPLEFORD PAPER PRODUCTS LIMITED, HAMILTON, ONTARIO - MONTREAL, QUEBEC

ETHAVAN goes three times as far

Ethavan, Monsanto's ethyl vanillin, is economical to use in baked goods because it has three times the flavoring strength of ordinary vanillin. It goes three times as far. The pronounced aroma that your products get from Ethavan invites customers to buy and try. The delicious, vanilla-like flavor brings them back to buy again. Both the flavor and aroma "stay" through cold processes or through the heat of baking . . . last until your delicacies are enjoyed by your customers. The flavoring strength of Ethavan always is uniform, making it easier for you to get identical results with every use of your recipe or purchased flavor.

Try Ethavan. It is available in 5-pound and 25-pound cans. Samples, pamphlet and quotations will be sent promptly upon request. Mail the coupon, contact the nearest Monsanto Sales Office or write: MONSANTO CHEMICAL COMPANY, Desk J, Organic Chemicals Division, 1737 South Second St., St. Louis 4, Mo.

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

MONSANTO FLAVOR AROMATICS

Ethavan (Monsanto's ethyl vanillin)

Methyl Salicylate Monsanto, U.S.P. (Synthetic oil of wintergreen)

Vanillin Monsanto

Coumarin Monsanto

Ethavan: Reg. U. S. Pat. Off.

FREE BOOKLET—*"Something About The Senses" contains an interesting story and file-worthy data on flavorings. Mail the coupon today for your copy.*

MONSANTO
CHEMICALS AND PLASTICS

MONSANTO CHEMICAL COMPANY
Desk J, Organic Chemicals Division
1737 South Second Street, St. Louis 4, Missouri

Please send, without cost or obligation, items checked: ______Sample and pamphlet on Ethavan; ______Booklet, "Something About The Senses."

*Name*____________________*Title*__________

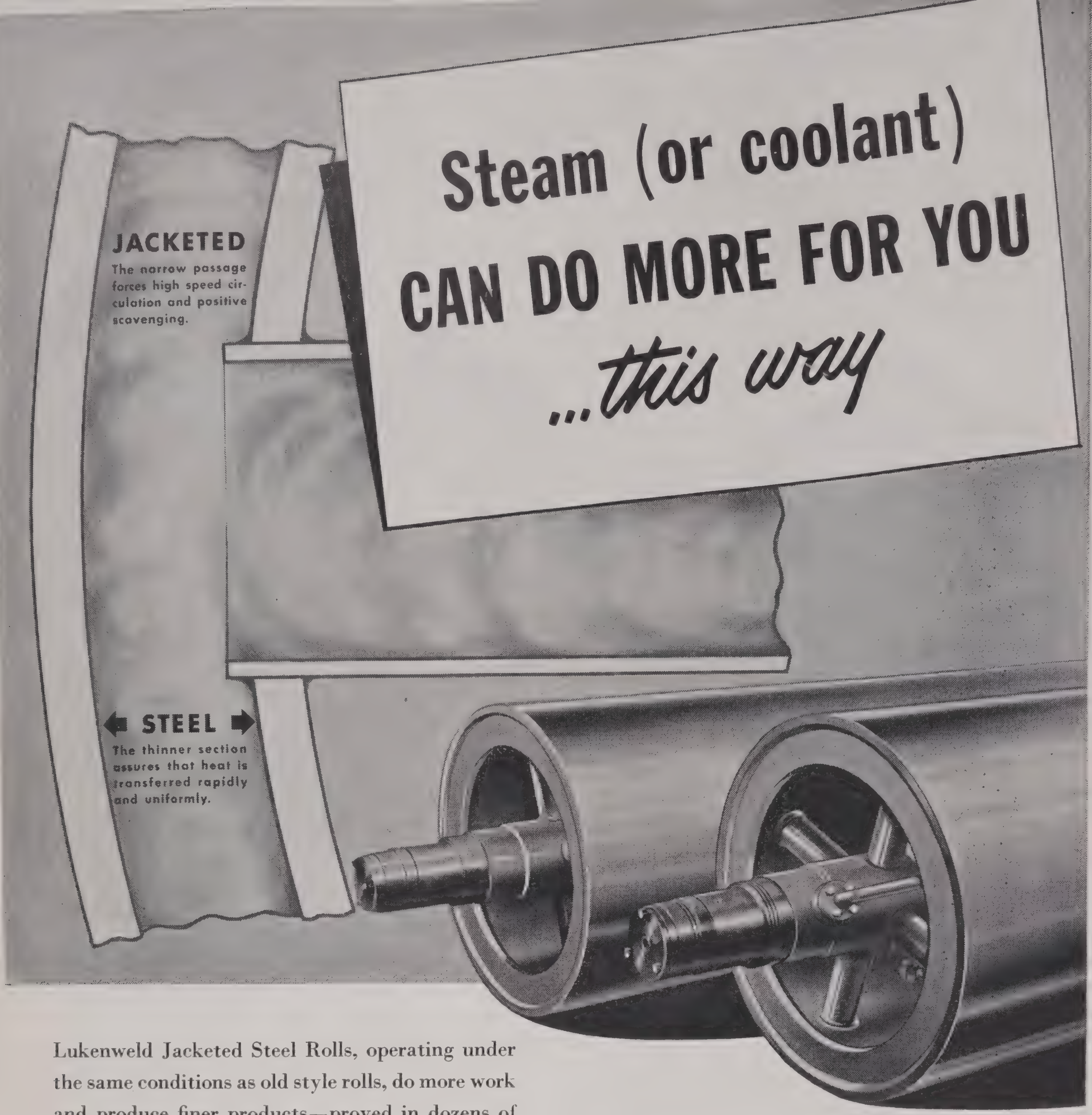
*Company*______________________________

*Street*________________________________

*City*________________*Zone*____*State*________

SERVING INDUSTRY . . . WHICH SERVES MANKIND

Steam (or coolant) CAN DO MORE FOR YOU ...this way


JACKETED
The narrow passage forces high speed circulation and positive scavenging.
STEEL
The thinner section assures that heat is transferred rapidly and uniformly.

Lukenweld Jacketed Steel Rolls, operating under the same conditions as old style rolls, do more work and produce finer products—proved in dozens of plants and on many different processes. And, where steam pressures were raised, production increases of over 60% have been reported.

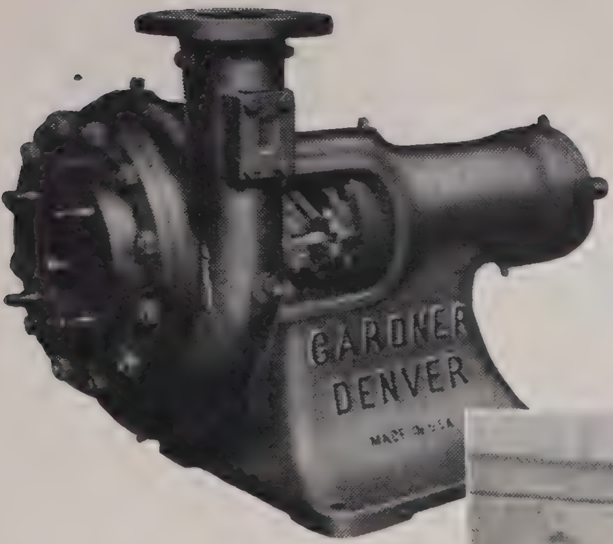
The welded steel plate construction of Lukenweld Rolls permits high pressures to be employed with safety. It also assures more uniform and faster heat transfer, whether the job is moving heat into or out of your product.

Lukenweld engineers will help select the rolls you need, then design and even build the machine section or complete unit. For a copy of Bulletin 358, giving more information on Lukenweld Rolls, and for this other help, write Lukenweld, Division of Lukens Steel Company, 401 Lukens Building, Coatesville, Pennsylvania.

LUKENS

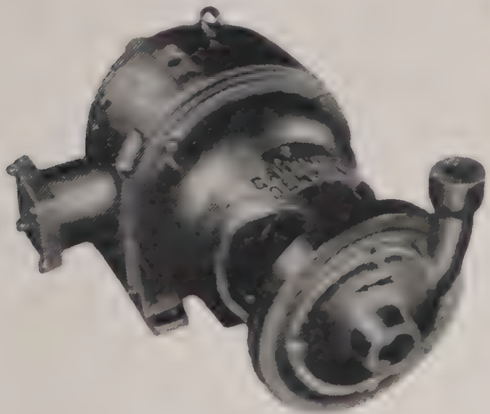
LUKENWELD DIVISION

DESIGNERS, ENGINEERS AND MANUFACTURERS OF MACHINERY

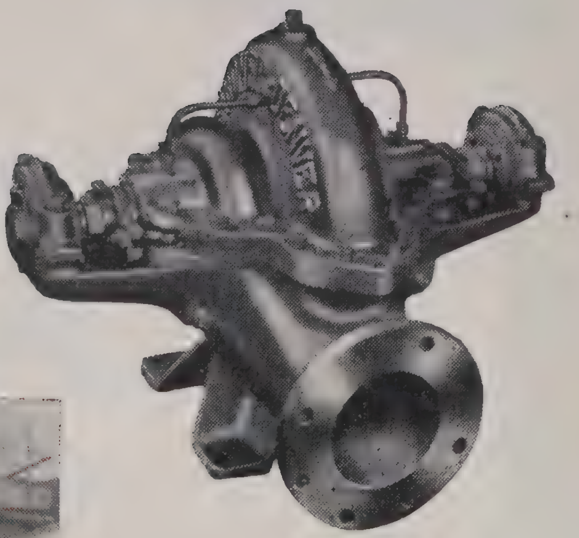


FOR HANDLING FLUIDS CONTAINING SOLIDS up to 6 inches in diameter, Gardner-Denver Sewage and Waste Disposal Pumps are built in capacities from 50 to 5000 gallons per minute.

COMPACT Gardner-Denver Close-Coupled Centrifugal Pumps may be installed in any horizontal or vertical position—are designed for capacities up to 250 gallons per minute and heads up to 250 feet.



Gardner-Denver's modern hydraulic testing laboratory, showing centrifugal pump direct connected to Dynamometer for efficiency test.



RUGGEDLY CONSTRUCTED FOR LARGE CAPACITY Gardner-Denver Horizontally Split Case Double Suction Centrifugals are available in sizes for all heads up to 300 feet.

FOR GENERAL UTILITY SERVICE Gardner-Denver Side-Suction Centrifugal Pumps are made in capacities up to 1600 gallons per minute and heads up to 100 feet.

Fully Tested

For Full-Value Efficiency Gardner-Denver Centrifugal Pumps

Since 1859

You can be sure of getting *full-value* efficiency on every one of your pumping jobs when you insist on Gardner-Denver *fully tested* Centrifugal Pumps. For every Gardner-Denver pump you buy has already proved its dependability and power economy — through thorough and accurate testing in our modern hydraulic laboratory, completely equipped with the best and most accurate testing equipment available. It's no wonder these popular pumps so easily attain and often exceed their rated efficiencies in hundreds of different kinds of pumping installations.

For expert advice on selecting just the right Gardner-Denver Centrifugal for any installation, or for further information on any of the pumps described here, write Gardner-Denver Company.

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada) Ltd., Toronto, Ontario

Speed Production—Cut Costs With ¼-Turn Seal

ANCHOR AMERSEAL* CAPS

IT'S the simplicity and ease with which *Ancho* Amerseal Caps may be applied that speed production and cuts packaging costs. *Ancho* Amerseals start at any point on the container finish —no matching or adjusting to threads is necessary. And a short ¼-turn effects a dependable airtight, leakproof seal.

The specially formed lugs of *Anchor* Amerseal Caps make contact at only a few points and ride under rather than over the glass thread. Unlike ordinary screw caps, *Anchor* Amerseals will not wedge or cement to the glass finish, making them especially effective for use with sticky, tacky, gummy or viscous products.

* Trade-Mark

PRODUCTION
PACKAGING COSTS

ANCHOR HOCKING
GLASS CORPORATION
Lancaster, Ohio

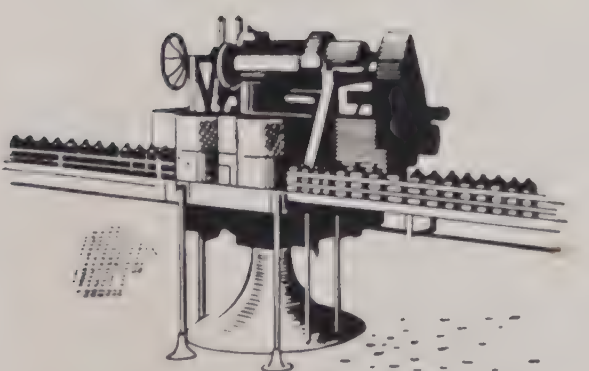
LABELING IS FAST on Uniform Anchorglass*

THE smooth, even sides of an *Anchorglass* Container make labeling fast and inexpensive. Whether the side of the container is round, oval or flat, and regardless of the method of labeling used in your plant, you'll get economical labeling with *Anchorglass* Containers on your lines.

Anchorglass Containers are uniform—uniform in all dimensions, and that's so important in labeling. Uniform in capacities and finishes, and that's important in your packaging operation, too. They're strong and will stand up in your labeling machines as well as in all packaging and handling operations.

Anchorglass Containers are available in all standard styles, capacities and finishes, in crystal, amber or emerald green glass to fit your every need.

*Reg. U. S. Pat. Off



Anchorglass

ANCHOR HOCKING
GLASS CORPORATION
Lancaster, Ohio

YARWAYS make it hot for "CHILI"

Marlo Packing Corporation, San Francisco, specialize in making deliciou chili con carne . . . and they rely o Yarway Impulse Steam Traps on cooking kettles to get that chili hot!

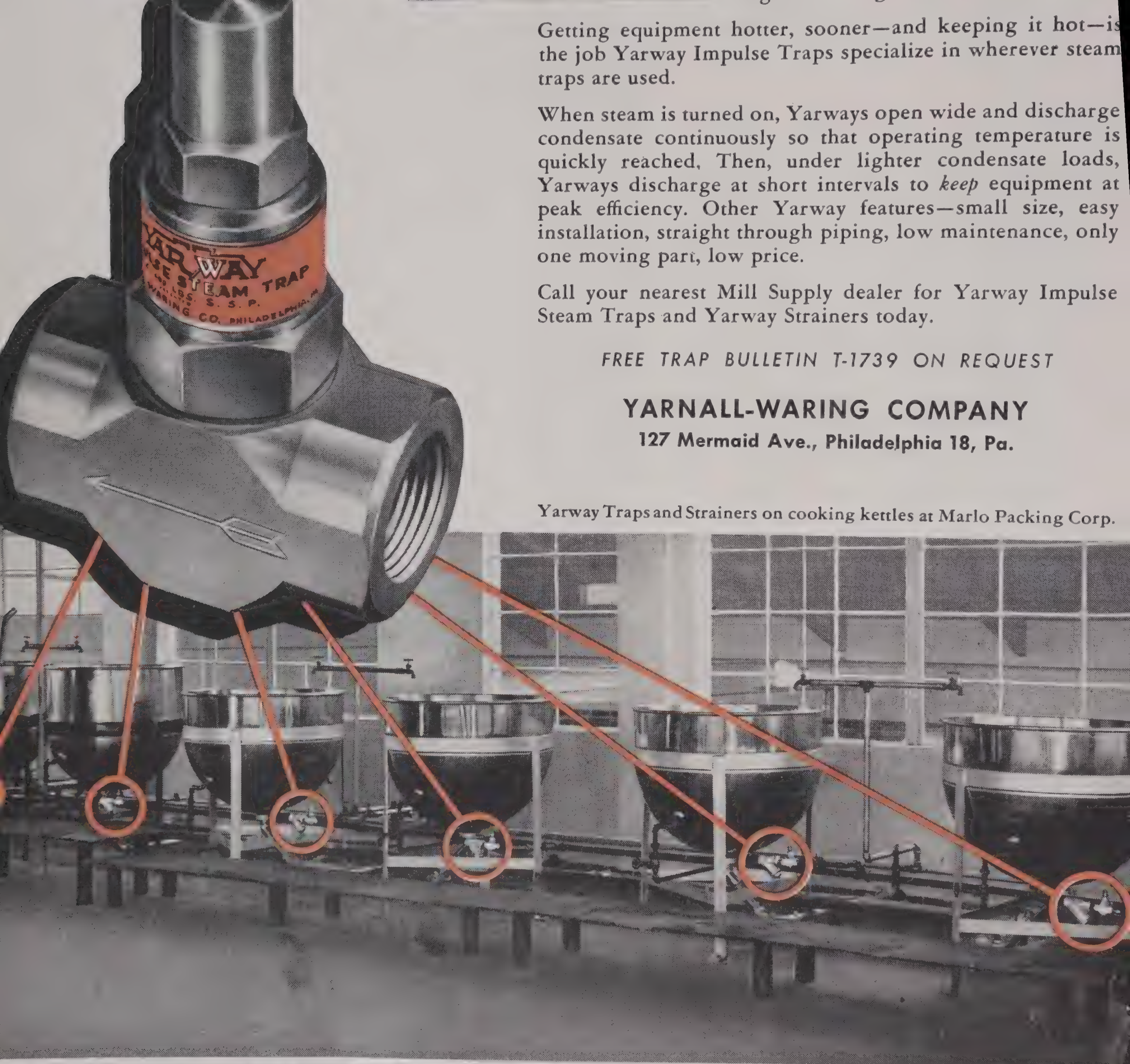
Getting equipment hotter, sooner—and keeping it hot—is the job Yarway Impulse Traps specialize in wherever steam traps are used.

When steam is turned on, Yarways open wide and discharge condensate continuously so that operating temperature is quickly reached. Then, under lighter condensate loads, Yarways discharge at short intervals to *keep* equipment at peak efficiency. Other Yarway features—small size, easy installation, straight through piping, low maintenance, only one moving part, low price.

Call your nearest Mill Supply dealer for Yarway Impulse Steam Traps and Yarway Strainers today.

FREE TRAP BULLETIN T-1739 ON REQUEST

YARNALL-WARING COMPANY
127 Mermaid Ave., Philadelphia 18, Pa.



Yarway Traps and Strainers on cooking kettles at Marlo Packing Corp.

YARWAY IMPULSE STEAM TRAP

PROFITS FROM DRYERS DON'T "JUST HAPPEN"!

Louisville Dryers have the built-in experience of 56 years devoted to solving drying problems.

This experience covers different industries, many products and various types of dryers such as Rotary Steam Tube, Indirect Steam, Direct Heat, Type "L" (Semi-Indirect Heat), Drum Dryers, Roller Presses, Dewaterers, Coolers, etc.

Sound engineering and design are translated into finished equipment through extensive manufacturing facilities and construction experience. Louisville Dryers are built in modern shops equipped for the fabrication of custom-made unit process equipment from all weldable alloys and steels.

If you have a drying problem, or are contemplating modernization of your present facilities, call upon General American.

OTHER GENERAL AMERICAN EQUIPMENT

Drum Dryers
Rotary Dryers
Thickeners
Filters
Roller Presses
Screw Presses
Turbo-Mixers • Evaporators
Turbo-Hydrogenators • Thickening Screens
Citrus Process • Malek Rice Process

GENERAL AMERICAN TRANSPORTATION CORPORATION

Process Equipment Division
(LOUISVILLE DRYING MACHINERY UNIT)
1004 Hoffman Bldg., Dept. 840, Louisville 2, Ky.
WORKS: Sharon, Pa., East Chicago, Ind.

PROCESS EQUIPMENT DIVISION
GENERAL AMERICAN
TRADE MARK

There's "magic" in these six numbers

...PERHAPS "MAGICAL" PROFITS FOR YOU, TOO

WHAT DO THESE NUMBERS DO? They pinpoint the six advantages of packaging products in metal containers.

ONE: Cans fill and close easier . . . faster.

TWO: Cans are break-proof.

THREE: Cans protect contents from light, air, dirt, insects, moisture.

FOUR: Cans are lightweight . . . mean lower shipping costs.

FIVE: Cans stack easier . . . stay that way.

SIX: Cans mean eye-appeal for impulse buying.

What other type package gives you *all* the advantages of metal containers?

None!

AMERICAN CAN COMPANY
New York • Chicago • San Francisco

This trademark CANCO *is your assurance of quality containers. Look for it!*

On thousands of applications in every field of manufacture, stepless variable speed operation assures exactly the right speed for every operation . . . for every operator . . . the right speeds for each change in the consistency or shape of the material being processed. Such variable speed operation pays off in higher rates of production, a more uniform better quality product and more efficient performance of your equipment and your operators.

variable speed operation helps you make a good job better

Master Speedrangers provide this infinitely variable speed in an all-metal, mechanical variable speed unit whose compactness and durability are extra features to help you make a good job better. And nowhere else will you find variable speed drives that are so flexible, so easily adaptable and in such a wide range of types and sizes.

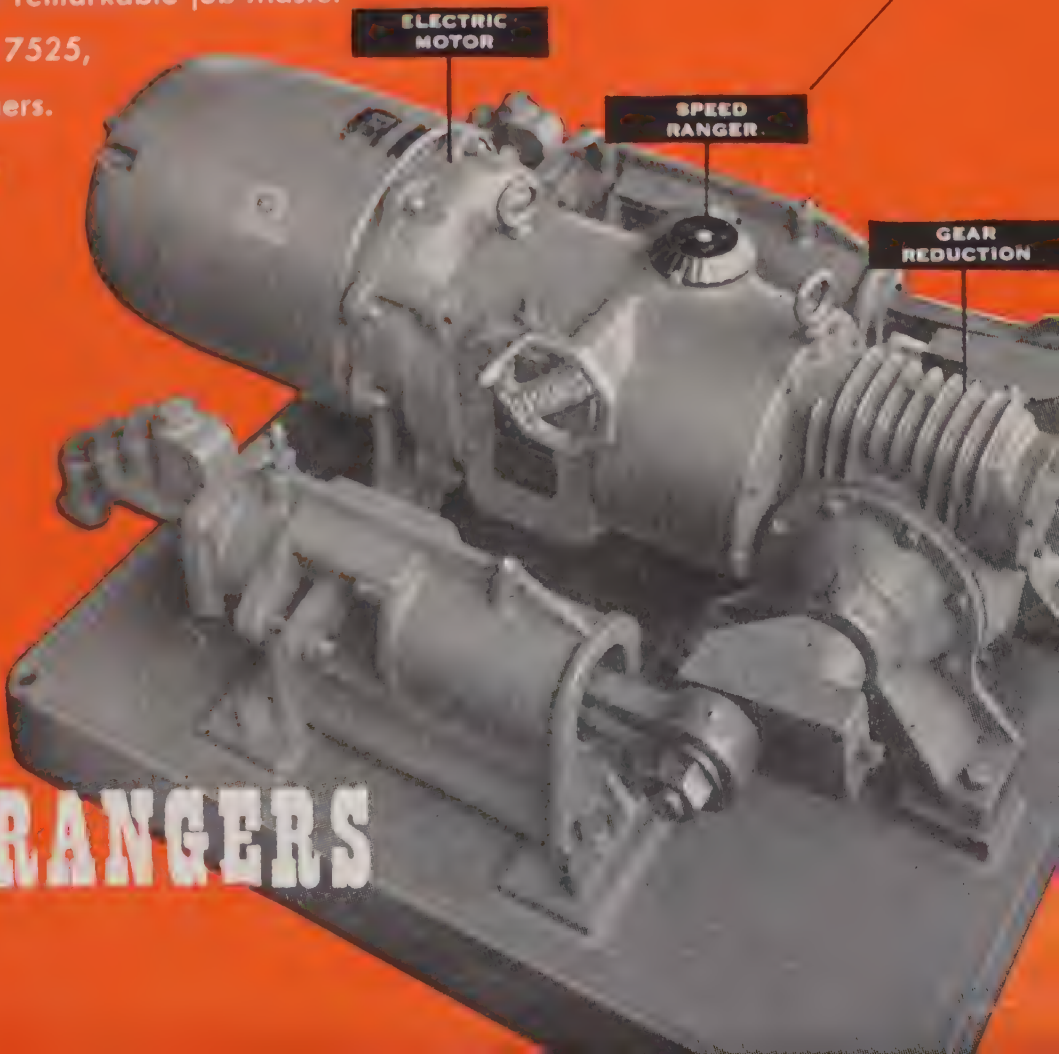
For example, look at the controlled volume pumps shown below. The Speedranger, on the drive unit incorporates an explosion proof motor, a variable speed unit and a gear reduction . . . all standard Master units that easily combine into one compact, integral power package. This provides exactly the right speed, the right features, in a unit that you can mount right where you want it.

Probably you will not need this same combination of features. However, the next time you need a drive for material processing, handling, and conveying equipment; mixers and agitators; welding-positioners; machine tool drives; testing and calibrating equipment . . . to name only a few . . . see what a really remarkable job Master Speedrangers can do for you. Write for Data 7525, new twenty-four page booklet on Speedrangers.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

especially when you use

MASTER SPEEDRANGERS



This BANANA FLAVOR can stand *HEAT* and *COLD*

FIRMENICH & CIE
CHUIT NAEF & CIE

Its excellent physical properties include, in addition to its effectiveness at extreme temperatures, an unusually high degree of concentration and maximum uniformity and stability.

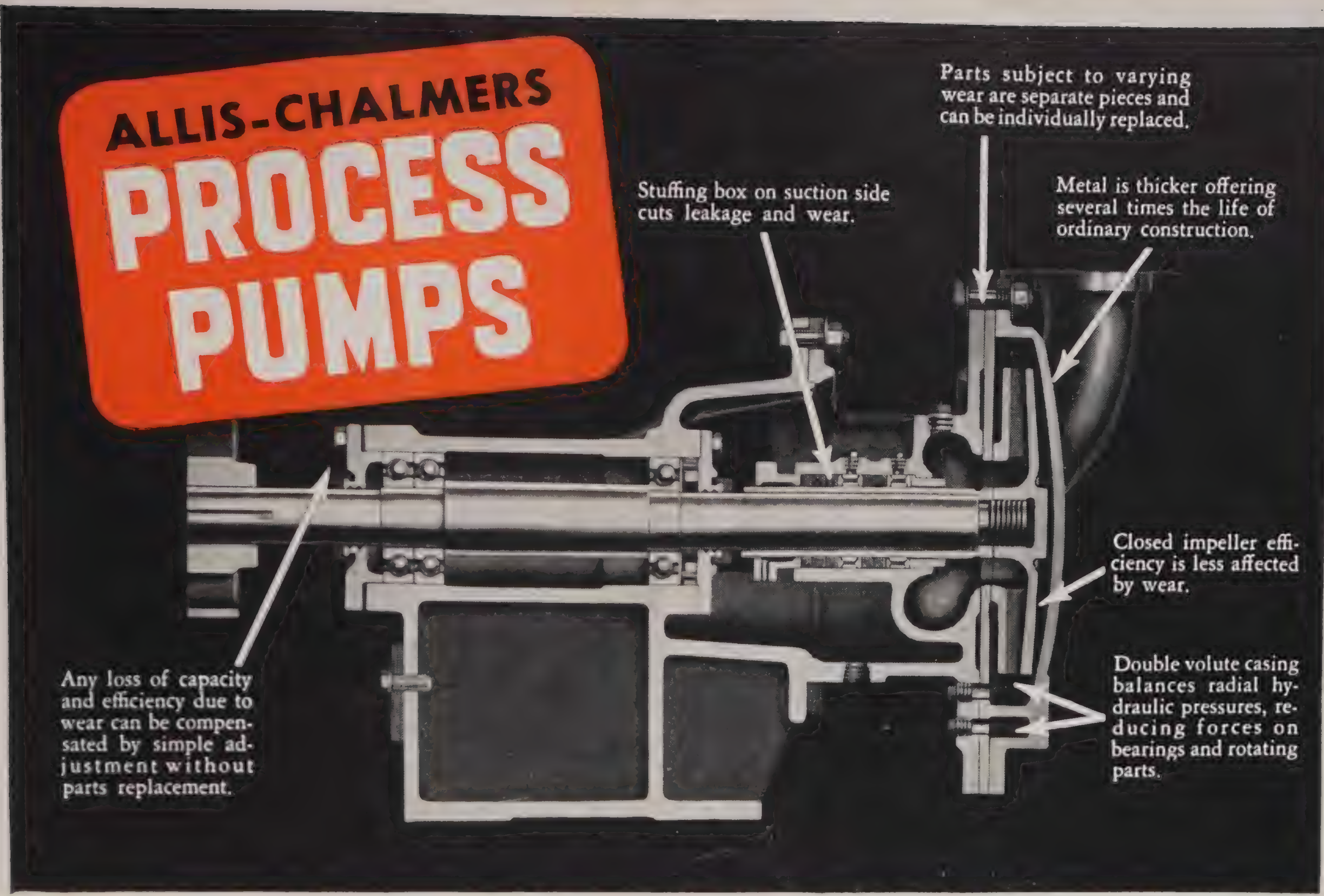
This is one of the relatively new group of synthetic flavors scientifically developed in our research laboratories to meet commercial requirements.

It is completely faithful to the taste and odor of ripe bananas.

For samples write to

FIRMENICH & CO.
250 WEST 18th STREET, NEW YORK 11, N. Y.
CHICAGO OFFICE: 612 NORTH MICHIGAN AVENUE
IN CANADA: CARAMEED, LTD., 350 WALLACE AVENUE, TORONTO
GENEVA, SWITZERLAND . . . PARIS, FRANCE

ALLIS-CHALMERS PROCESS PUMPS


Parts subject to varying wear are separate pieces and can be individually replaced.
Stuffing box on suction side cuts leakage and wear.
Metal is thicker offering several times the life of ordinary construction.
Closed impeller efficiency is less affected by wear.
Double volute casing balances radial hydraulic pressures, reducing forces on bearings and rotating parts.
Any loss of capacity and efficiency due to wear can be compensated by simple adjustment without parts replacement.

Stop Pump Troubles

ON ABRASIVE CORROSIVE JOBS

- **Pump Life Multiplied**
- **Maintenance and Overall Costs Cut Sharply**

THIS A-C PROCESS PUMP was made for abrasive and corrosive jobs on which ordinary pumps, even when made of special materials, run up sky-high maintenance bills. Here is the pump for uninterrupted service and amazingly low maintenance costs handling liquids of medium and heavy specific gravities with abrasiye solids or mild corrosive action or both.

RECORD SAVINGS

Users report savings of as much as $1,000 per year per pump. A typical user replaced parts in 6 to 10 weeks even using toughest alloys. Now he reports no replacements on A-C process pumps in 20 months.

STOCKED IN 4 MATERIALS

Shipment from stock on complete pumps and all parts in aluminum-bronze, Ni-resist, 18% chrome steel and 316 stainless steel. You need not carry spare parts. For more information, see your A-C Authorized Dealer or Sales Office or write for bulletin 08B6615.

A-2735

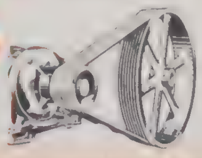
ALLIS-CHALMERS, 1113A SO. 70 ST.
MILWAUKEE, WIS.

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.



TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

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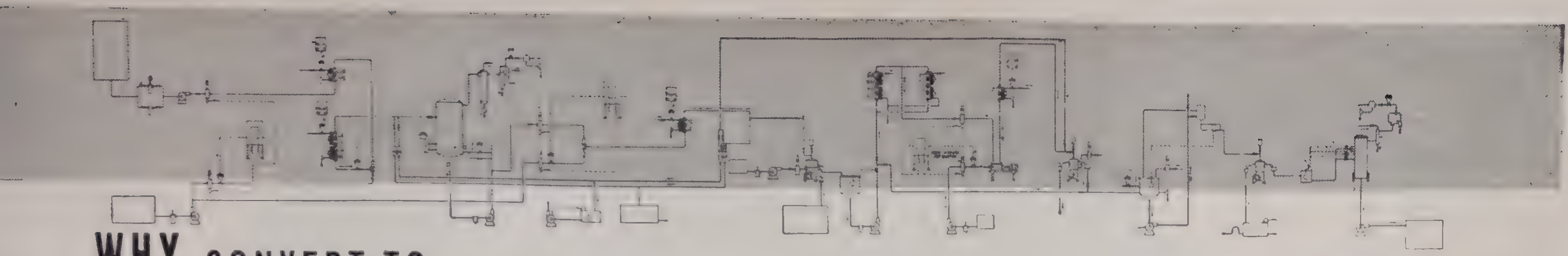
YES, SHARPLES can convert your plant from caustic to soda ash refining.... utilizing virtually all your present equipment

ONLY SHARPLES PROVIDES THE CLAYTON PROCESS *plus*

IF you are now refining vegetable oil in a Caustic Process plant, you can readily gain all the advantages of Soda Ash refining. The Sharples Corporation has a practical and economical conversion plan whereby your caustic refining plant is converted to the Soda Ash (Clayton) Process with a minimum expenditure for additional equipment . . . and a minimum interruption in your production.

SHARPLES—CENTRIFUGAL AND PROCESS ENGINEERS



WHY CONVERT TO THE CLAYTON PROCESS

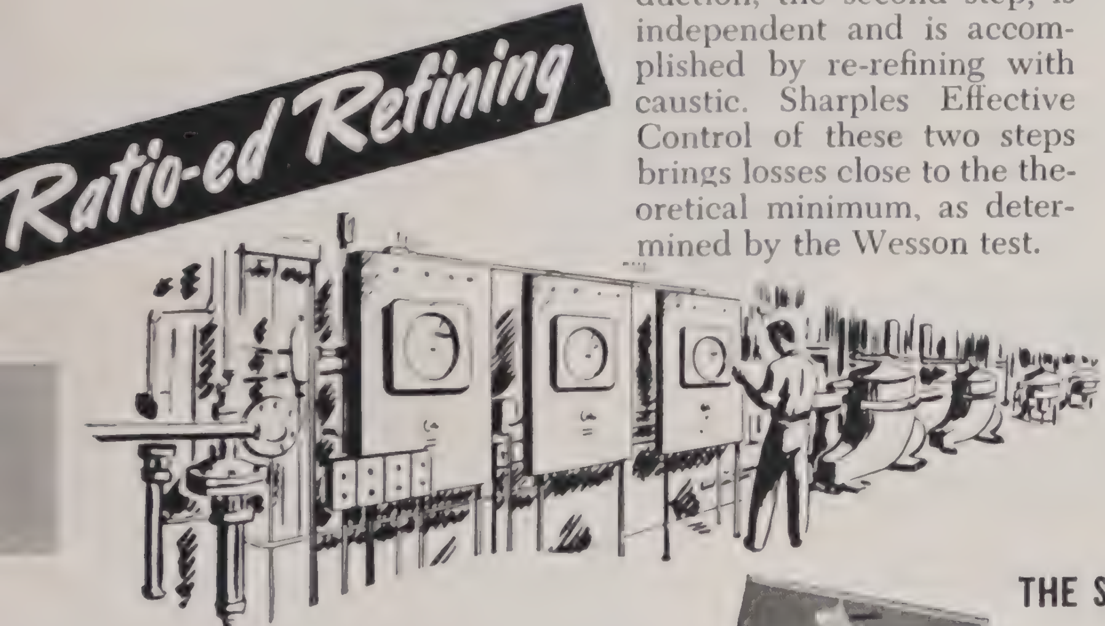
Conversion to the Soda Ash (Clayton) Process is strictly a dollars and cents consideration. Depending on the nature of your refining operations, increased profits from your plant can quickly repay the conversion costs and go on year after year to reap additional profits.

REDUCED LOSSES

It's a simple fact that you obtain a greater yield of quality oil with Soda Ash Refining. From the same amount of crude oil, you get more saleable product . . . more dollars of return on your investment.

Actual comparisons show that the Soda Ash Process can effect as much as a 25% reduction in refining losses over the Caustic Process. This means as much as 720 extra pounds of refined product per tank car of crude oil.

This saving is possible because of the basic operation of the Soda Ash Process. It consists of two distinct refining steps. The first step utilizes non-saponifying soda ash to neutralize the free fatty acid. Color reduction, the second step, is independent and is accomplished by re-refining with caustic. Sharples Effective Control of these two steps brings losses close to the theoretical minimum, as determined by the Wesson test.



GREATER FLEXIBILITY

Whether speaking of a greater variety of oils or a broader range of crude oil qualities, your conversion to the Soda Ash Process will give your plant greater versatility . . . the ability to shift from one oil to another as business conditions necessitate.

The Soda Ash Process will refine practically any commercial vegetable oil . . . and non-vegetable materials such as tallow, hog fat and fish oil. Likewise, it will refine very low free fatty acid oils or oils with up to 10% free fatty acid content with equal ease and success. Many oils such as solvent extracted soya or coconut, which give trouble at times in caustic refining, refine with no difficulty whatsoever by the Soda Ash Process.

COLOR

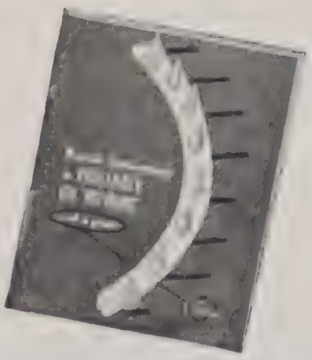
Inasmuch as color affects your selling price and the marketability of your product, satisfactory color reduction without excessive refining losses made possible by soda ash refining is important to you. In this process, color reduction is a separate operation, separately controlled by the Sharples *Ratio-ed Refining* System. Good color reduction even on oils like black cottonseed may be obtained by the Soda Ash Process without the sacrifice of excessive oil losses.

SIMPLIFIED OPERATION

The additional steps of the Soda Ash Process actually simplify vegetable oil refining. Independent control of neutralization, emulsion formation, soapstock consistency and color reduction eliminate the problem of trying to compromise one factor against another for best overall results. Sharples Effective Control of each factor maintains continuous high operating efficiency at all times.

THE SHARPLES SODA ASH PLANT PAYS OFF QUICKLY . . . GET THE COMPLETE FACTS TODAY.

Sharples engineers will be glad to make a dollar-for-dollar evaluation of the Soda Ash Process in terms of your specific refining operations . . . and prepare a plant layout, without obligation, utilizing your present equipment and plant space.



Ask to have the Sharples engineer call at your plant . . . or send for the new Sharples Bulletin No. 1240 entitled, *"Practical Considerations in Vegetable Oil Refining . . . for a profit."*

The SHARPLES CORPORATION

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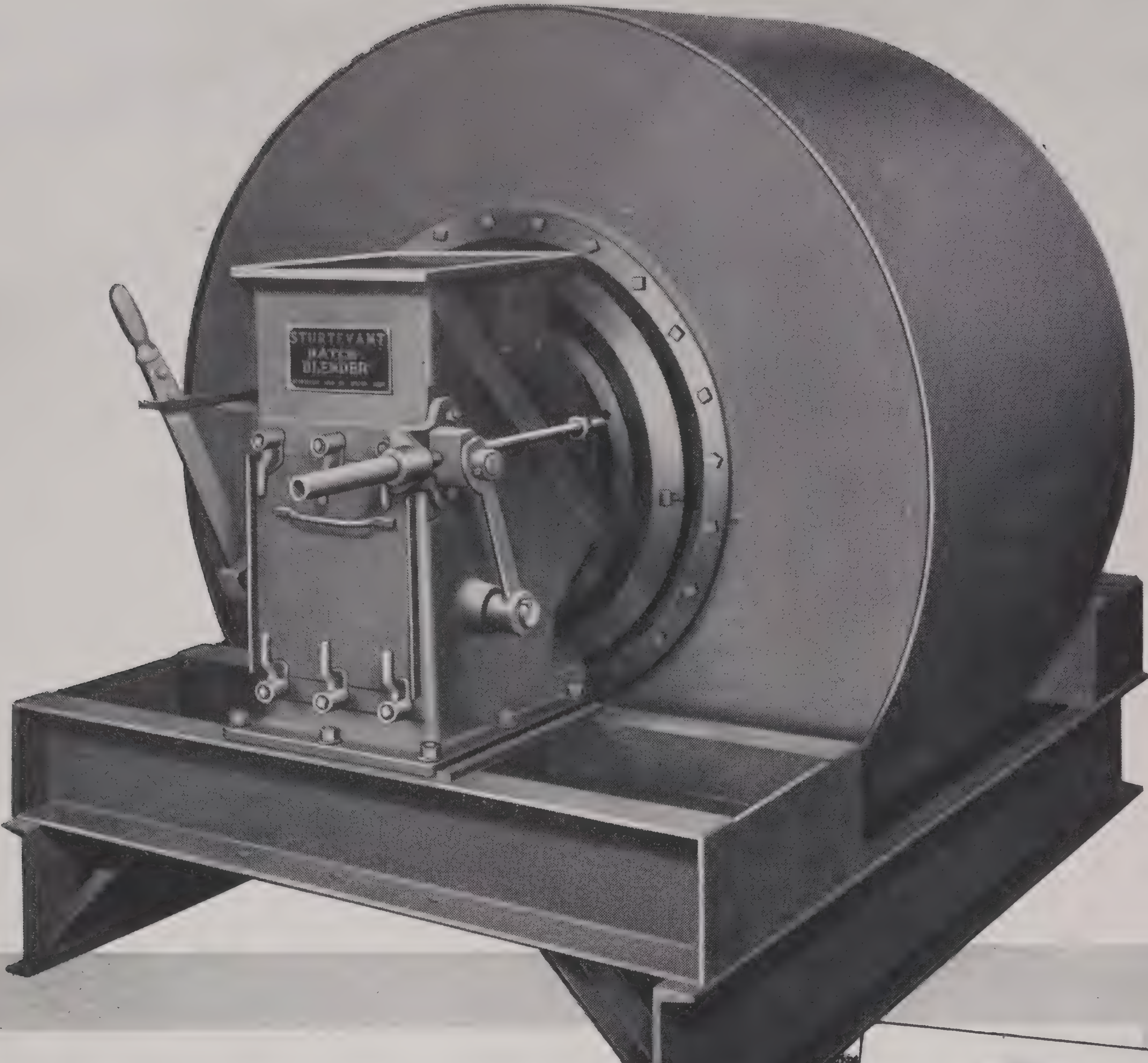

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Thoroughly Blend Substances into an Inseparable Mass

The 4-Way Mixing Action of the Sturtevant Dustless Blenders thoroughly mixes two or more substances into an inseparable whole . . . every part of which is the same analysis. Single receiving and discharging opening insures tight sealing during mixing process. "Open-door" accessibility permits thorough cleaning. The fast, accurate mixing operation increases output . . . cuts mixing costs. Available in many sizes with mixing capacities from ¼ ton to 75 tons per hour. Write for information and catalog.

Receiving — The ingredients to be mixed enter the mixing chamber of drums through a chute. Note scoops which carry up and dump the ingredients as drum rotates assuring a more uniform mix.

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Not a flavoring,
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Ac'cent will bring out—sustain—*natural* flavors in the foods you pack

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PURE VEGETABLE GLUTAMATE

In 100
and
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A TYPICAL TEST OF
Ac'cent®
IN CREAM STYLE CORN

Add ⅜ teaspoon (about 1.2 g.) of AC'CENT to a #2 can of your cream style corn, just before sealing, and stir it in. Mark the can, seal it and process right along with your regular batch. After cooling and aging a few days, cut the AC'CENT sample and a control. The fresher, fuller flavor of the corn with AC'CENT will be unmistakable.

Probably no food product in this generation has stirred up as much interest and conjecture as Ac'cent. And no wonder. For Ac'cent does two things for foods that nothing before has ever done with such amazing success.

Without adding any flavor, aroma, or color of its own, it (1) *intensifies natural flavor*, and (2) *guards flavor* against the usual loss in processing.

> *Ac'cent is a 99+% pure MSG—mono sodium glutamate, a derivative of vegetable protein. It is the sodium salt of the amino acid, glutamic acid, which occurs naturally in all vegetable and animal protein. In Ac'cent, a pure MSG, you get the full benefit from this vegetable derivative.*

Already there is a large amount of convincing data on the use of Ac'cent in food processing. We invite you to look into the information we have on the use of Ac'cent in your products. Members of our staff of food technologists and chefs are on call to consult with you in your plant and supervise tests.

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Ac'cent makes food flavors sing!

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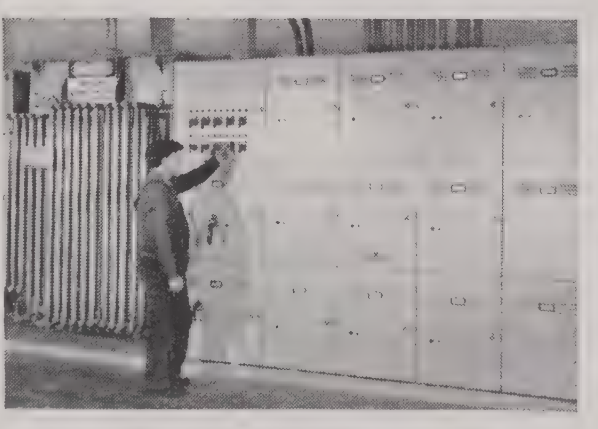
electrically co-ordinated to process beets —at 2 tons a minute!

New $5,500,000 beet sugar plant looks to electric equipment supplied and engineered by General Electric to help maintain high processing output.

The American Crystal Sugar Company's new plant at Moorhead, Minnesota, is another example of an electrical system equipped and co-ordinated almost entirely by General Electric. Playing an indispensable part in the plant's high output of granular and powdered sugar and dry beet pulp, this G-E system needs little or no maintenance attention, helps cut over-all processing costs!

Whatever the food you process or the size of your plant, you, too, can profit by discussing your electrical needs with a G-E industry specialist. From a complete, integrated plant system geared to continuous processing, to motors and control for a single operation, his advice can be counted on to help quicken production, cut costs. Call him today at your nearest G-E office. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

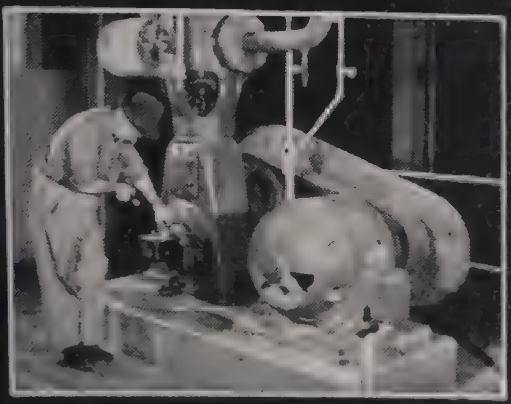
1 The Moorhead plant, put into operation last fall, has a G-E Turbo-Alternator with a power capacity of 2500 kw. Shown here is G-E Metal-Clad switchgear with 4 magne-blast air circuit breakers, rated at 600 amperes, 4160 volts. Units are completely metal-enclosed for personnel safety. Bulletin GEA-3083.



2 Four G-E unit substations (one shown here) are placed in load center areas throughout the plant to step down power from 4160 volts to 440 volts right where it's needed. This eliminates voltage drop caused by long, low-voltage feeders. Compact and space-saving, G-E unit substations are quickly, inexpensively installed. Bulletin GEA-3592.

3 Controlling Tri-Clad ® motors on scrolls, agitators and pumps are these two G-E Cabinetrol ® equipments, providing centralized low-voltage motor controls in compact, factory-assembled "packages." Rigid steel enclosure protects workmen, keeps out dust. Bulletin GEA-3758.

GENERAL ELECTRIC



4 About 85 per cent of the motors in this new plant are of Standard G-E Tri-Clad construction, triply protected against physical damage, electrical breakdown, and operating wear and tear. This Tri-Clad open (drip-proof) motor drives one of the plant's air compressors. Bulletin GEA-3580.

5 At locations such as this where motor operation might be affected by powdered or granular sugar, the new plant uses G-E totally enclosed fan-cooled motors. This one drives a 100 lb. valve bag machine for sacking granular sugar. Bulletin GEA-4400.

6 These three G-E Type CR-1062 switches on the 5-lb. sacking line control the filling turret and conveyor, the spanker, and the scale. Used for small single and three-phase motors, these compact switches provide complete protection against injurious overload conditions.

Co-ordinated Electrical systems for food plants

NEW—
A COST-SAVING SERVICE
for motor users!

Here's a new way for you to cut motor repair costs, machine downtime, spare-motor inventories. With General Electric's Tri-Clad Motor Exchange Plan, you can now replace an ailing motor without long, costly production delays.

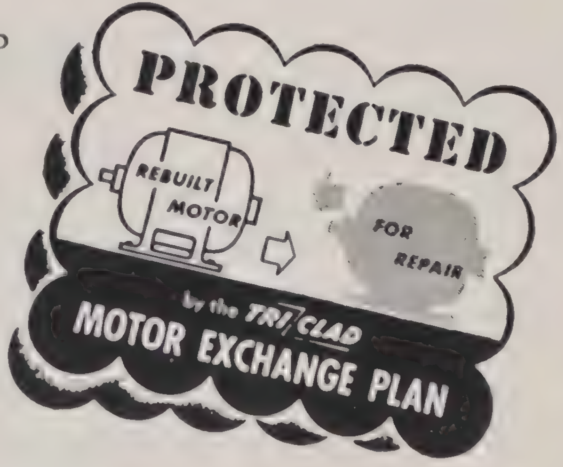
The plan is simple

All you have to do is call your regular motor supplier. Quickly, without red tape, he exchanges your inoperative motor for a factory-reconditioned motor of the same type and rating, with a new-motor warranty.

The cost is low

You can exchange motors less than a year old free of charge. Those with from one to five years of service are exchanged at a small fixed charge. For motors over five years old, the fixed charges are slightly higher.

The exchange plan now includes Tri-Clad Type K, KC, and KCJ standard general-purpose motors from 1 to 5 hp—covering many food plant needs—and will soon be extended to other Tri-Clad types. See Bulletin GEA-5189.



WANT MORE DATA?

General Electric Company, Section A 652-3
Apparatus Department, Schenectady 5, N. Y.

Please send me the following bulletins:

- ☐ GEA-3083—Metal-Clad Switchgear
- ☐ GEA-3580—Tri-Clad open dripproof motor
- ☐ GEA-3592—Load center unit substations
- ☐ GEA-3856—Cabinetrol
- ☐ GEA-4400—Tri-Clad totally enclosed motor
- ☐ GEA-5189—Tri-Clad motor exchange plan

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SEPTEMBER, 1949

Food
Industries

Charges of Monopolies in Food Processing Ridiculous

Secretary of Agriculture Brannan implies that there are monopolies in the food processing industry. He has cited prewar figures purporting to show that the three largest meat packers did 43 percent of the total business, the three largest manufacturers of cheese 63 percent, the three largest flour milling concerns 38 percent, and the three largest food canners 30 percent.

By citing three companies in each instance, we suppose the Secretary meant to imply that three constitutes a monopoly. Which shows either gross ignorance of business operations or a desire to use the food industry as a political football—or both.

In the first place, there is no industry in which competition is keener than in the food field. This is borne out by the fact that average profits are only 3 cents on the sales dollar. Secondly, when three big companies go after the same market on a national scale, the competitive fur really flies. Each does its darnedest to outdo the others pricewise and quality-wise. Out of this never-ending battle come better values for the consumer, together with new products. And this competition makes itself felt among other processors.

If the Secretary would take the trouble to read the financial reports of the food companies which he thinks are monopolies, he would find some interesting facts.

The big packers, for example, made only about 1 cent on the sales dollar in the boom year of 1948. And the second largest firm operated at a loss of several million in the first half of this year.

One of the large millers reports a profit of only 2.8 cents per dollar of sales for the fiscal year ending May 31. Earnings totaled $11,654,036, of which $5,934,019 was paid out in dividends and $5,720,017 was reinvested in the business to lower production costs and prices.

Precisely what this company did with each sales dollar is shown by the following breakdown: For raw materials, supplies and services, 83.9 cents; to employees, 10.6 cents; for taxes, 2.1 cents; to stockholders, 1.4 cents; for future development, 1.4 cents; for wear and tear, 0.6 cents. Note that most of the income was passed on for supplies and services, that workers got almost two-thirds of the remainder, and that taxes took half again as much as was paid to stockholders or spent for future development.

Obviously, this company is not enjoying the profits of a monopoly, nor is the big meat packing concern which lost several millions.

Look at it another way: The Secretary admits that prices which processors paid for farm commodities were above even the high parity figures during most of the war and postwar years. Would monopolies pay such prices at a time when consumer resistance to prices of processed food progressively reduced the already slim profit margins of the processors?

When the government's price support scheme is not operating, the price for farm products is established by supply and demand. It is not set arbitrarily by food processors. In the first quarter of 1948, the processor paid farmers $2.91 for products which cost him $1.00 in 1939. He also paid $1.93 for labor which was $1.00 in 1939. And it cost him half again as much to ship his products to market. At each step, the cost of doing business—materials, labor, equipment—was up 75 to 100 percent.

So despite an investment of about half a billion a year in better plant and equipment to cut costs, the food processors' expenses increased enough more than their prices to cut average profit to about two-thirds of what it was in 1939.

The Secretary is also worried about the "concentration" in food manufacturing. If he would look into this, he would find that small plants usually are modernized after being purchased by a larger company. This reduces costs and benefits the consumer, or the farmer, or both. What's wrong with that?

As a final point, consumers don't have to buy the products of any one food company, certainly not in these days of surpluses. The fact that national brands are in strong consumer demand merely goes to show that the larger companies give quality at a fair price. It does not indicate a monopoly.

—F. K. LAWLER, *Editor*

The Talk of the Industry

Infant Industry Shows the Way

It may be an infant in terms of age, but the baby-food industry is no child when it comes to applying improved methods. One large packer is sterilizing fruit puree in a continuous heat exchanger to eliminate retorting. The product is filled into cans at about 225 deg. F., and the cans are inverted to sterilize the lids.

This same firm also passes every glass jar of baby food through an x-ray machine of its own design. This unit detects any possible foreign materials which would damage junior's stomach.

Another processor of foods for the new generation uses a photoelectric scanner which detects the slightest flaw in the rims of the glass jars. Thus danger of an imperfect seal and subsequent spoilage is avoided.

Well, nothing is too good for the little fellow who some day may be President.

Good News About Distribution Costs

Encouraging progress is being made in reducing food distribution costs, a trend which importantly supplements higher efficiency in processing. The combined mark-up of both wholesaling and retailing in some instances is as low as 15 percent, compared to a prewar minimum of 25 percent, according to GMA's Paul Willis.

'Tis good news, indeed, to processors. Often in the past they have struggled to whittle pennies off their prices, only to see their products take a big mark-up in distribution channels.

Built-In Bugicide for Food Bags

To minimize insect penetration to food handled in cotton bags, the Southern Regional Research Laboratory recommends a new textile treatment. This effectively prevents insect infestation in such material as flour, even when it's kept a long time in a room containing thousands of hungry flour beetles and moths.

The treating material consists of pyrethrins or a mixture of pyrethrins with piperonyl butoxide. These insecticides are of comparatively low toxicity to warm-blooded animals, so that the danger of contaminating the food is said to be negligible.

Of course, there's always the possibility that some crusading consumer group will start to scream about "poisoned" bags.

Mushroom Discovery Kicks Horse

Harry Humfeld and Frank Siegihara told the recent meeting of the Institute of Food Technologists of their experiments in what seems to be hydroponic culture of mushroom mycelia. They thereby struck another blow at the fast disappearing horse, though at the same time opening new possibilities in food technology.

For years, mycologists have tried to develop synthetic media on which to grow mushrooms. But, despite the long and earnest search by capable scientists, nothing seems to be quite as satisfactory as horse manure—provided t horses have been fed on timothy hay.

Apparently the boys at the Western Regional Researc Laboratory have solved the mushroom mystery. If the have, it probably will mean that mushroom flavor can b made available at low cost in the near future. And eve the cost of orthodox mushroom culture may be greatl reduced.

Pretzels Halt Halloween Hell-Raising

Halloween is coming soon, along with broken windows, stolen gates, upturned back-yard powder rooms, and other juvenile devastation. Which offers certain food processors an unusual opportunity to perform a much-appreciated public service—and at the same time promote their products.

How to do this has been shown by Halter's Pretzels, Inc., Canton, Ohio. This company loads police cars with pretzels to be handed out free to children prowling the streets. A two-week publicity program prior to Halloween puts the children wise to the free deal.

First trial in Canton reduced calls on juvenile vandalism from the previous 23 to only 2, making that Halloween "one of the quietest in years." Instead of police running after children, the children ran after the police.

New Word for Your Dictionary

The Interdepartmental Committee on Pest Control in Washington has officially defined "toxaphene." When we hear about using that new insecticidal chemical, we should now understand that the material is chlorinated camphene containing from 67 to 69 percent by weight of chlorine. The coined name was originally a trade-name controlled by Hercules Powder Co. That firm has surrendered its private rights, and the word is now a common noun. Let's hope that it kills the bugs.

Hors d'Oeuvres

■ Dairy Industry Society, announcing a new booklet, notes that "the cow chewing her cud would be surprised if she knew about the men and machines, the services and industries required to take care of her milk." Well, you don't have to blab it to her, do you? There's enough trouble with labor and raw materials right now.

■ Oregon State College is playing up to the milk givers, too. They've designed 15 dairy plant plans, which include detailed instructions for "milking parlours, lounges, and lounging shed." If you find you can't support a cow in the proper manner, goats are still reasonable about accommodations.

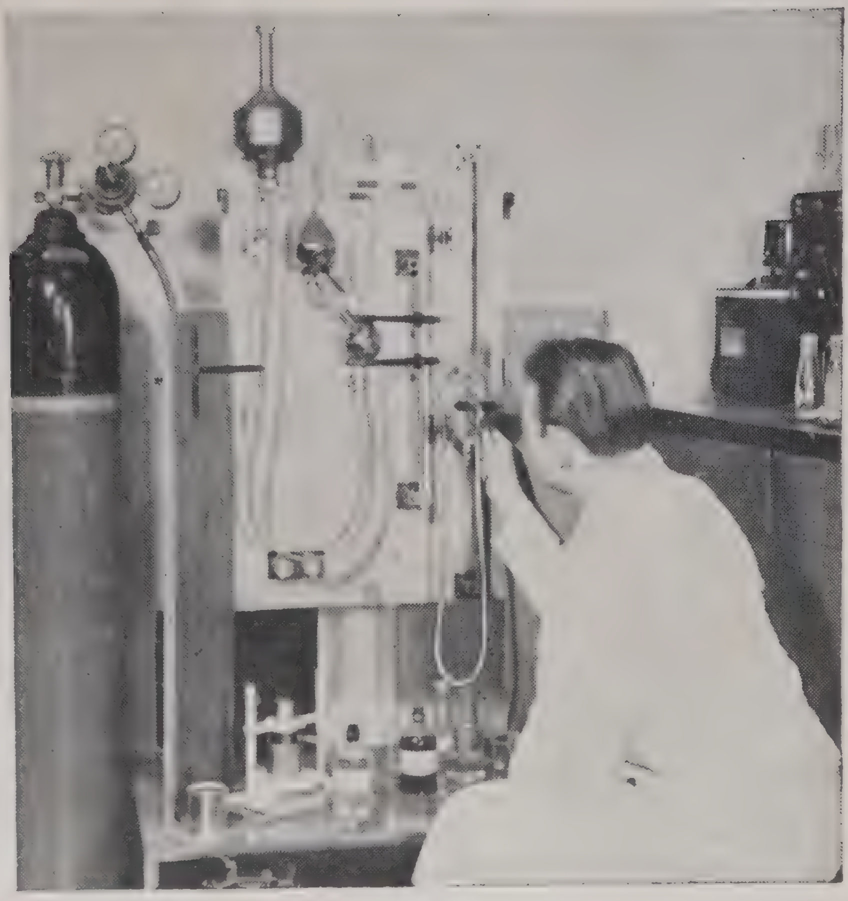
■ A Connecticut tomato grower devised polyethylene covers for some of his plants. And the tomatoes on those plants were ready for harvest way ahead of the non-covered. The "Poly" apparently concentrated the sun's rays and held in the moisture. Think of the saving on feed if this thing could be made to work on beef and pork stocks.

■ If you have some Roquefort cheese labels laying around, it might be a good idea to get some Roquefort cheese to go along, if you plan to use them. Roquefort Assn. of New York City brought a jar of blue cheese into court that had been labeled "Roquefort Cheese in Old Brandy." The brandy was o. k. but it took a $150 fine to mellow the judge on the cheese.

J.A.J.J.

Precise Checks Prove Values of Gas

PEROXIDE TESTS on edible-oil shipments were negative when the oils were given full nitrogen protection.



HERE, chemist measures dissolved or head-space gases in nitrogen-processed and nitrogen-packed food.

How Nitrogen Protects the Quality of Foods

By excluding air, this gas can prevent losses in flavor, odor, color and nutritive value. Applications are mounting

W. S. WALKER

Chemical Engineer, New Products Division,
The Linde Air Products Co., New York City

Proper use of nitrogen in many food processing and packaging applications will prevent or retard deterioration in foods due to oxidation.

Flavor, odor, color, texture, and nutritive values of foods often diminish in the presence of oxygen. But nitrogen prevents oxidation in foods by removing and excluding air from foods by displacement and/or protecting foods by blanketing them during processing and packaging.

One of the simplest principles in using nitrogen is to remove all oxygen possible from a product. This removal should be as early in the processing as practical. From then on, and until the consumer opens the package, contact with oxygen should be avoided.

In some cases, it is possible to prepare food products in their natural state under a blanket of nitrogen and thus protect them. This nitrogen blanketing is an optimum protection method which is not generally practiced today.

Many foods (especially liquids) are in equilibrium with air early in their preparation. In addition, when air is dissolved in liquid foods, the dissolved gas often contains over 30 percent oxygen by volume. This preferential solubility of oxygen takes place in liquid foods even though the atmosphere contains only about 21 percent oxygen by volume.

Giving Foods Nitrogen Treatment

Often it is impossible to avoid the presence of dissolved oxygen during the early stages of processing foods. If practical, liquid foods may be deaerated by heating, vacuumizing, or stripping with an inert purging gas. The stripping technic will result in the loss of a smaller portion of the volatile constituents. Also, heating in the presence of oxygen will be avoided.

Nitrogen, carbon dioxide, or steam may be used as a purging gas under certain circumstances. According to laboratory studies and limited experience, the nitrogen method should be effective and economical for commercial applications.

When nitrogen is used as the purging gas, the liquids are saturated with nitrogen and may be further protected by nitrogen-blanketing. Thus, the liquids are protected from further oxidation. Liquids may be blanketed with nitrogen during processing, storage, filling, and transit in tank cars.

After some liquid foods have been condensed, powdered, or evaporated, they may require additional treatment with nitrogen. Certain solid or semisolid foods may also require treatment with nitrogen after they have been deaerated.

Some failures have occurred when oxygen-containing foods were packed in an atmosphere of nitrogen. For example, a bottled liquid can have more oxygen dissolved in it than is present in its head-space.

While the use of nitrogen is beneficial in food processing, full value is derived by keeping the product protected in an atmosphere of this gas until the consumer opens the package. For this reason, packages must be impervious to oxygen and moisture in order to be suitable for nitrogen-packing.

Nitrogen Used to Break Vacuum

The vacuums utilized on canning machines may run 20 in. and up. Values in this range permit packers to speed production and to guard against "paneling" (caving in) of the cans.

Some cans larger than the 8-oz. peanut size may, if subjected to high vacuums, panel and collapse when used for foods that are not capable of supporting them. For this reason, can companies will, in some cases, recommend breaking the vacuum back with nitrogen.

Superior oxygen removal is possible. It can be achieved by following the break-back with a second vacuum. However, this method is slow and costly.

Purging Head-Space

Some foods are machine-packed without pulling a vacuum. In such cases, there may be an attachment on the machine to permit purging the head-space before sealing.

Although some head-space-purging attachments get out of adjustment, it is possible to operate them so that the head-space contains less than 1 percent of oxygen after sealing.

In some cases, steam is used to remove oxygen. After the container is sealed, cooling will condense the steam, thus creating a vacuum. In other cases, nitrogen is used to purge head-space of the container before sealing. Examples of foods treated this way are orange juice, shortening, and cranberry jelly.

Head-space purging with nitrogen may cause a partial vacuum after sealing. The formation of a vacuum, however, depends upon the temperature of the contents at the time of sealing. In some cases, a more soluble gas, such as CO_2, is mixed with 20 percent nitrogen to create a partial vacuum.

Heat-sealable flexible films that are suitable for nitrogen-packaging include a few commercially available metal-foil laminates. And some experimental transparent and laminated films being tried out commercially are proving satisfactory. But there are indications that they may cost considerably more than cellophane. In this instance, use might be limited to high-priced specialty items.

Flexible Films for Nitrogen-Packing

Transparent laminated films are being successfully used to nitrogen-pack peanuts. In this case, transparency is required for consumer acceptance. If oxygen were present, light would pass through the film and catalyze rancidity reactions, thus shortening shelf life. But by nitrogen-packing peanuts in a transparent film, the nuts are still acceptable after 90 days.

Leading can companies have gas-packing equipment available to the trade. Packing-machines include facilities for simple head-space purging with steam or gas. These units also include provisions for another type of machine which breaks-back a vacuum with gas.

Flexible film packaging machines are capable of doing a good job. They have been used to nitrogen-pack dried yeast in metal-foil film and nuts in transparent laminated film.

Better Cranberry Jelly

Cranberry-jelly producers nitrogen-pack before sealing cans in order to—

1. Retain a lighter and more uniform color throughout the jelly. Before the nitrogen-packing method was used, the presence of oxygen caused cans to corrode. In particular, there was corrosion at lap-seam and head-space interfaces. And as a result, the jelly darkened.
2. Maintain a stable gel consistency.

Widespread nitrogen-packaging of potato chips and potato sticks depends upon the availability of a suitabl film at the right cost. Some manufacturers successfully nitrogen-pack fried potato products in tin cans.

Yeast Gets Protection

Some leading yeast manufacturers use nitrogen gas, as mentioned above. The yeast is put up in laminated metal-foil envelopes that are heat-sealed by automatic machinery. One maker is canning dried yeast in an atmosphere of nitrogen.

For some time, nitrogen has been used in packaging fat-containing foods such as whole dried eggs, whole dried milk, powdered milk formulas, and cocoa.

During the processing of mayonnaise and salad dressing, relatively large quantities of air are whipped into the mixture. Experiments showed that nitrogen, when used in place of air, prolongs non-rancid shelf life.

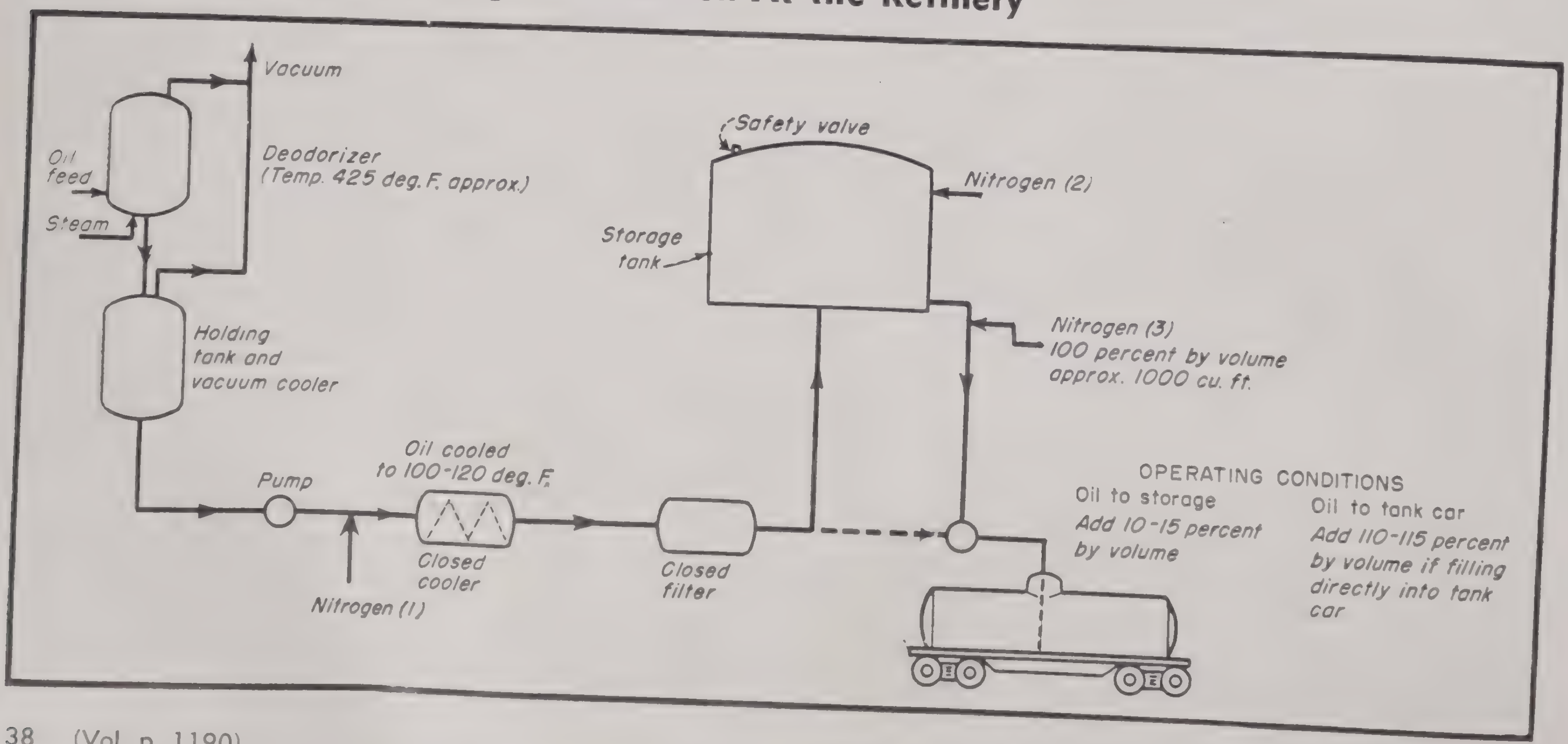
In many cases, processing with nitrogen prior to final packaging might improve the product. Oxygen would be removed from the product more thoroughly.

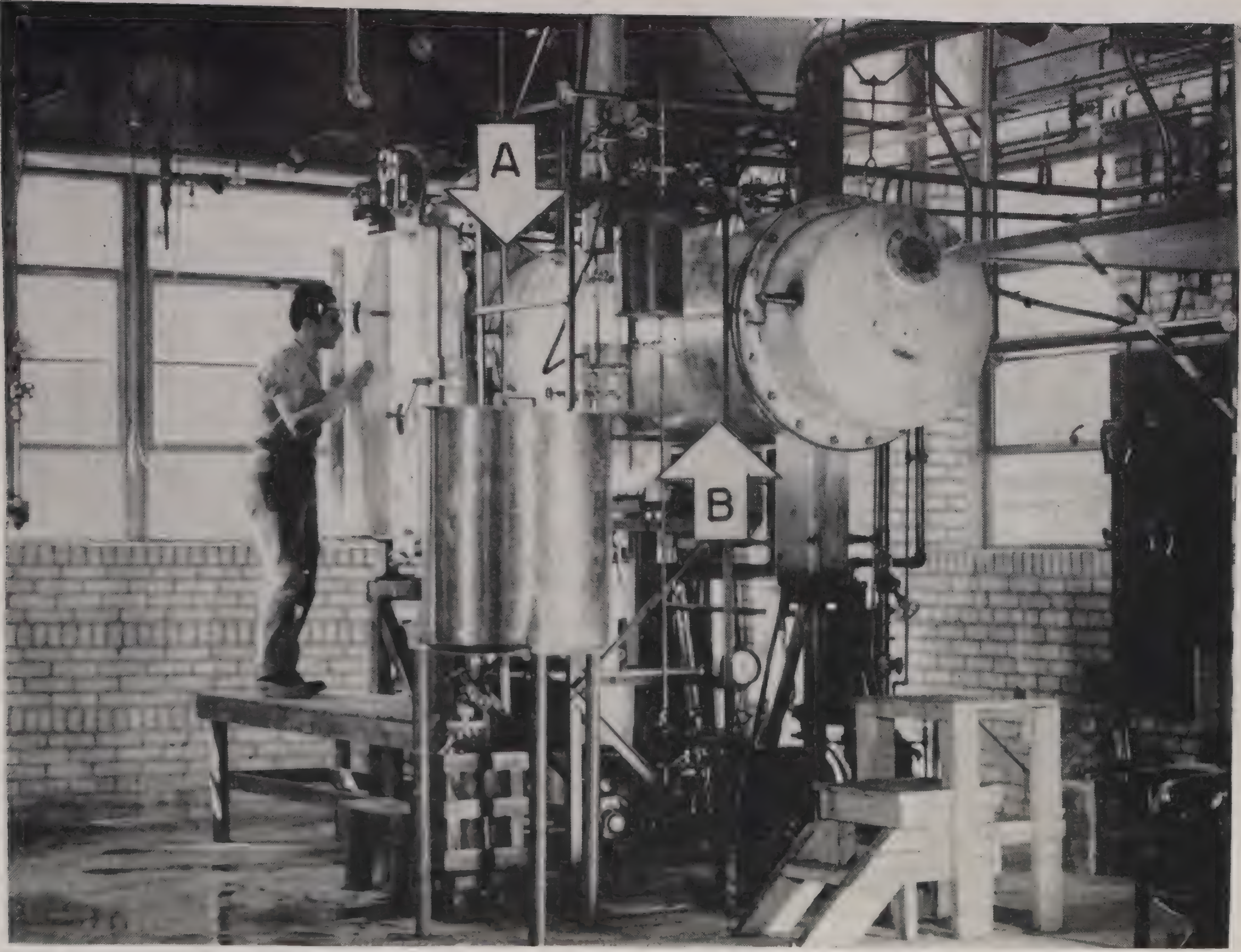
Some West Coast orange juice canners have sealed single-strength juice in enamel-lined cans after purging the head-space. Certain of the packers are considering nitrogen-stripping fresh juice to remove oxygen and then saturating the juice with nitrogen. Deaerating by this method results in the removal of less volatile essences than occasioned in the vacuum method. Furthermore, the cost of equipment is lower.

During the past tomato juice canning season, nitrogen processing tests were conducted on a production basis. These experiments showed that this method definitely improved vitamin C

(Turn to page 190)

How Edible Oils Get Nitrogen Protection At the Refinery


Vacuum
Oil feed
Deodorizer (Temp. 425 deg. F. approx.)
Steam
Holding tank and vacuum cooler
Pump
Oil cooled to 100-120 deg. F.
Closed cooler
Nitrogen (1)
Closed filter
Safety valve
Storage tank
Nitrogen (2)
Nitrogen (3) 100 percent by volume approx. 1000 cu. ft.
OPERATING CONDITIONS
Oil to storage
Add 10-15 percent by volume
Oil to tank car
Add 110-115 percent by volume if filling directly into tank car



PILOT-PLANT belt dryer in operation at Cambridge, Mass. Through peep hole, technician observes loading of belt. Material enters at (A), travels through drum (B), and finished product is collected directly below entry point.

High Vac Belt Dryer Improves Product, Cuts Costs

Readily oxidized foods dehydrated by this unit in absence of air retain potency of flavor and are instantly soluble. High capacity, labor economies noted

E. G. HELLIER

National Research Corp., Cambridge, Mass

Heat- and oxygen-sensitive products—such as coffee extract, amino acids, and milk—can now be economically dehydrated at a lower pressure range than heretofore feasible. Employed is a recently developed continuous high-vacuum belt-dryer.

This new unit produces a pseudo-crystalline product which has lyophilic characteristics.

As for coffee, National Research Corp. has found that the dehydrated product turned out by the new dryer has very high sales appeal because of its improved physical appearance, taste and solubility.

More than two years of continuous pilot-plant operation with coffee extract have, in short, shown that this dryer produces an instantly soluble coffee of much better flavor. The cost of operation, at 1 mm. of mercury absolute pressure, is higher than drum drying at 25 mm., but it is comparable to spray drying at less than 300 deg. F. inlet gas temperature.

Until recently, low temperature drying had been considered impractical on an industrial scale, and its use had been restricted to the handling of relatively small quantities of expensive products.[1]

Then, during World War II, tremendous advances were made in high-vacuum technology. Notably, the demand for large quantities of blood plasma and penicillin led to the development of improved high-vacuum drying methods. Our company had for many years been studying problems of vacuum dehydration, and early in the war it demonstrated its "vacuum diffusion process," in which water vapor is continuously removed as ice, by means of rotary condensers, at free air pressures in the range 1-50 microns.*

Substantially all of the larger penicillin plants both here and abroad originally adopted this process, and their drying equipment was designed, built, and installed by our engineers.[2]

By 1945, we had developed a process for the production of orange juice concentrate by vacuum methods. For the exploitation of this process, the Vacuum Foods Corp. was organized as a subsidiary. Its food plant, with a present daily capacity of 75,000 gal. of the well-known Minute Maid juice, was designed, built, and put into operation by our organization. It has

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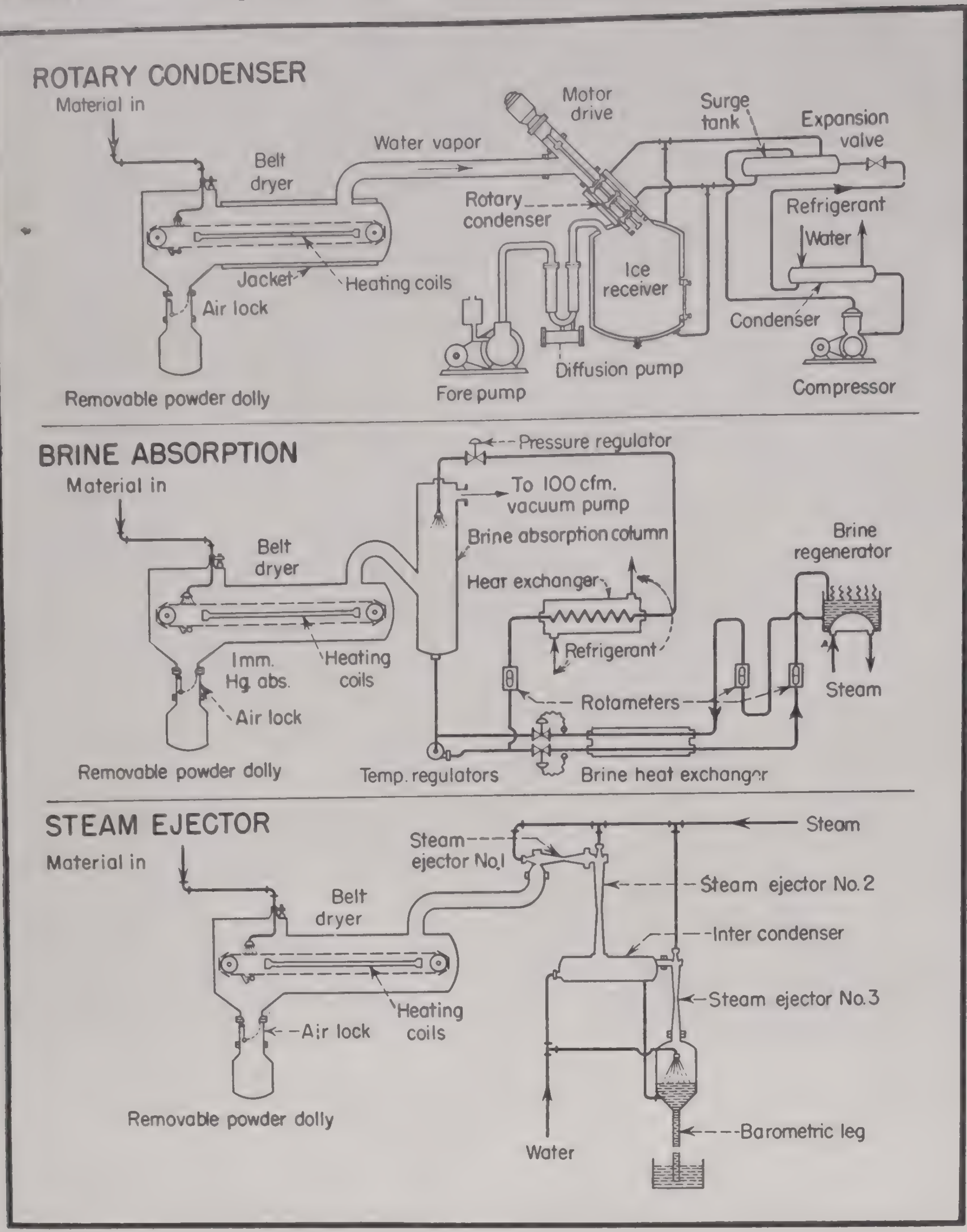
* 1 micron = 10^{-3} mm. Hg.

Three Belt Drying Vacuum Systems


ROTARY CONDENSER
Material in
Belt dryer
Water vapor
Motor drive
Surge tank
Expansion valve
Rotary condenser
Refrigerant
Water
Ice receiver
Jacket
Heating coils
Air lock
Condenser
Diffusion pump
Fore pump
Compressor
Removable powder dolly
BRINE ABSORPTION
Material in
Pressure regulator
To 100 cfm. vacuum pump
Brine absorption column
Brine regenerator
Belt dryer
Heat exchanger
Refrigerant
Imm. Hg abs.
Heating coils
Air lock
Rotameters
Steam
Removable powder dolly
Temp. regulators
Brine heat exchanger
STEAM EJECTOR
Material in
Steam ejector No.1
Steam
Steam ejector No. 2
Belt dryer
Inter condenser
Steam ejector No.3
Heating coils
Air lock
Removable powder dolly
Barometric leg
Water

been a pioneer in the development of this rapidly expanding industry.[3,4]

The Five Prime Reasons

The food industry employs high vacuum dryers for the following reasons.

1. Many foods which enter into biochemical processes are very active and easily become oxidized in air at comparatively low temperatures. By drying these materials in the absence of air, the potency of flavor of the material is protected.

2. High vacuum drying permits rapid removal of water or other solvent at relatively low temperatures, without thermal decomposition of the material being dried.

3. Since vacuum equipment is especially constructed, and by definition is vacuum tight, a high vacuum process lends itself readily to sterile operations.

4. Many solutions become highly viscous at high-solids concentrations. In the final stages of drying, the solution is concentrated into a sticky mass which dries and rehydrates only with great difficulty. By vacuum dehydration, these solutions can be taken through the viscous state at relatively low temperature, and a product is produced which has a lyophilic structure. Such a structure allows the immediate penetration of solvent into the low density, porous material, and it is instantly soluble.

5. Storage decomposition of most dehydrated products can be controlled by limiting the residual water content. It is necessary in conventional dehydration processes to raise the temperature of the material appreciably for water removal. High vacuum dehydration easily removes even the last few percentages of water at low temperatures.

Schroeder has demonstrated[5] that the percent of soluble solids in solution directly affects the production rate (lb. of dry material per hr.). Thus, it is advantageous to dry solutions at the maximum concentration which is feasible. The aforesaid equipment, operating at 75,000 gal. of orange juice per day, has demonstrated that large scale vacuum concentrators are eminently successful. There is no change in the flavor or vitamin C content of the juice. Vacuum concentration is a simple, effective process assuring maximum dryer production.

The author has already shown[6] that drying relatively thin films of solutions offers these two advantages:

1. Increased drying rate (lb. per hr. per sq. ft. of drying surface).

2. Better quality through shorter drying cycles.

How Dryer Is Constructed

A continuous type dryer can best exploit the advantages of thin-film drying. A belt dryer with a spray nozzle loading device was selected because this type can easily be operated over a wide range of temperatures, pressures, and drying cycles.

The belt dryer (see photograph) consists of a jacketed round shell welded to the side of a drying cabinet. A dished head is bolted to the open end of the shell, and the cabinet has a door (vacuum tight) to simplify maintenance of internal parts. Inside the shell and cabinet is a moving belt made of stainless steel plates bolted to two chains. The latter pass over sprocket wheels which are driven, through a vacuum-tight shaft-seal, by means of a motor equipped with variable speed drive.

Between the belt surfaces is a grid of heating pipes, and a spring loaded scraper blade is set against the under side of the belt for the removal of the dried material. Above the belt a spray nozzle attached to a moving arm deposits a thin uniform film. Under the scraper blade are vacuum valve and hopper for the removal of dried powder without interruption of the continuous drying process.

The Unit In Action

Operation of the belt dryer is relatively simple:

The solution to be dried is usually deaerated by the process of spraying it into a vacuum tank at about 25 mm. It is then passed through a filter to the dryer spray nozzle and arm, which are moved back and forth over the belt so that a uniform very thin, wet film is deposited. Large bubbles immediately form in this film.

Rapid removal of water at this stage lowers the temperature and increases the solids concentration. The viscosity immediately becomes so great that the bubbles remain practically intact during the subsequent drying. Due to the extremely small unit loading (lb. per sq. ft.) and the adhesive nature of materials at high solids content, no material falls off. The product hangs on the under side of the belt for the cycle's second half.

The dried product may be removed from the belt by a rotary brush or a stainless steel scraper blade. It falls through a vacuum valve into a removable dolly. The dried product has very low density and is irregular in size. It is usual practice to break up the gross particles to the size which will give the desired bulk density.

This type belt dryer works its advantages as follows:

It is continuous. There is no time in the operation in which the drying area is not producing, and hence there are relatively high capacities.

Because the material to be dried is sprayed on the belt in a thin film, the drying cycle is relatively short, and the time during which the product is at the drying temperature is sufficiently brief to assure a good quality product. The heat input can be controlled along the belt so that a temperature gradient can be maintained. This is important in attaining maximum production.

Labor cost of continuous drying is low, for one man can operate a large vacuum belt dryer. And since the through-put of material is high, the unit cost of labor and amortization are low. By controlling the concentration of the solution sprayed on a unit area of the belt, almost any desired density of product can be obtained, and the belt capacity increases as the specific volume increases.

Cite Product Characteristics

The above advantages of vacuum belt drying can best be applied to heat- and air-sensitive substances which have the following important characteristics:

1. Viscosity of 5 to 15 centipoises at room temperature.
2. Concentration of not greater than 60 percent soluble solids.
3. Temperature tolerance of not greater than 160 deg. F.
4. Final moisture content of less than 3 percent.
5. Initial freezing point of solution not less than —15 deg. C.
6. Particles held in suspension not greater than .020 in.

Typical examples of materials which have the above characteristics are coffee extract, amino acids, and milk.

Before the war, our company had developed a refrigerated sleeve condenser, inside of which rotated a scraper blade for the continuous removal of the condensed ice. The advantage of this type of condenser is its maintenance of a refrigerated surface at a constant, low temperature. This rotary condenser has been used widely in dehydration systems, both in the U. S. and abroad, and it is still considered the most efficient condenser for handling large amounts of water vapor in the micron range of pressures.

However, concurrently with the development of the belt dryer, we developed a refrigerated liquid absorption unit which can be operated continuously and efficiently at pressures of 0.10 to 4 mm. of mercury, using lithium chloride brine solution for lower pressures and calcium chloride for higher pressures.[7]

From 4 mm to 50 mm., the most efficient water vapor pumping systems are steam ejectors with intercondensers and barometric legs.

Dehydration Cost Data

Table I shows that high vacuum-low temperature dehydration is relatively expensive and that the cost increases rapidly as the pressures and temperatures are reduced. It should be noted that in this table the dryer size is constant, and that as the temperature increases, there results an increase in dryer capacity, which is mainly responsible for the reduction in unit cost.

Table II shows that the cost of dehydration quickly falls to 3 to 5c. per pound of water for reasonably sized production plants.

A tabulation of belt dryer-rotary condenser or belt dryer-steam ejector systems of various sizes would show similar decreases in operating cost with increased size of this equipment.

It is evident in Table II that the decrease in drying costs is due to increased production at fixed labor cost and to the relatively slower increase in other costs.

Influenced by Requirements

In Table I, it is shown that, for the most economical operation, material should be dried at as high a temperature and pressure as possible. The main limitations are the requirements for flavor, potency, solubility and density. The specifications for each product are different. And with the widely varying drying requirements, plant equipment must be custom built to produce the desired result.

In order to determine the optimum operating conditions, it is usually necessary to conduct test runs. For this purpose, a variety of experimental drying equipment is employed.

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2. Morse, R. S., *Industrial and Engineering Chemistry* Vol. 39, 1064, 1947.
3. Burton L. V., FOOD INDUSTRIES Vol. 19, 617, 1947.
4. Schwarz, H. W., Penn, F. E., *Industrial and Engineering Chemistry* Vol. 40, 938, 1948.
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7. Tucker, W. H., and Sherwood, T. K., *Industrial and Engineering Chemistry* Vol. 40, 832, 1948.

Here Are Pertinent Cost Data on Belt Drying Operations

TABLE I.—Cost Data for Belt Drying Systems (Area of Belt, 40 sq.ft.; Concentration of Typical Solution, 35 percent solids)

Basis	Belt Dryer With Rotary Condenser		Belt Dryer With Brine Absorption System		Belt Dryer With Steam Ejector System	
a. Belt temp., deg.....	0 to 100 F.		40 to 160 F.		80 to 200 F.	
b. Operating pres......	1 to 500 microns		0.5 to 4 mm.		4 mm. and up	
c. Dryer capacity.....	5 lb. dry material/hr.		10 lb. dry/hr.		20 lb. dry/hr.	
d. Water condensed....	9.3 lb. water/hr.		18.6 lb. water/hr.		37 lb. water/hr.	
e. Plant invest.*......	$30,000		$25,000		$16,000**	
Operating Costs						
a. Power.............	18.8 kw.	$.376	15 kw.	$.300	.7 kw.	$.014
b. Water.............	600 gal.	.010	600 gal.	.010	3,000	.060
c. Heat..............	10,000 Btu.	.019	75,200 Btu.	.076	530 lb. steam	.536
d. Labor.............	1 man	1.250	1 man	1.250	1 man	1.250
e. Amort.............	59,500 hr.	.505		.420		.270
Total cost...........		$2.160		$2.056		$2.130
Cost/lb. product......		.432		.206		.106
Cost/lb. water........		.232		.111		.061
Operating Costs Without Labor						
Total Cost less labor...		.91		.806		.88
Cost/lb. Product......		.183		.081		.044
Cost/lb. Water.......		.098		.044		.025

* Plant investment figures are for drying a specific substance.
** Steam plant not included in case of steam ejector systems

TABLE II.—Dehydration Operating Costs of Various Sizes of Belt, Dryer-Brine Absorption Plants

General Operating Data: Temp. of Belt, 40 to 160 deg. F.; Vacuum, .5 to 4 mm.; Typical Solution, 35 percent solids

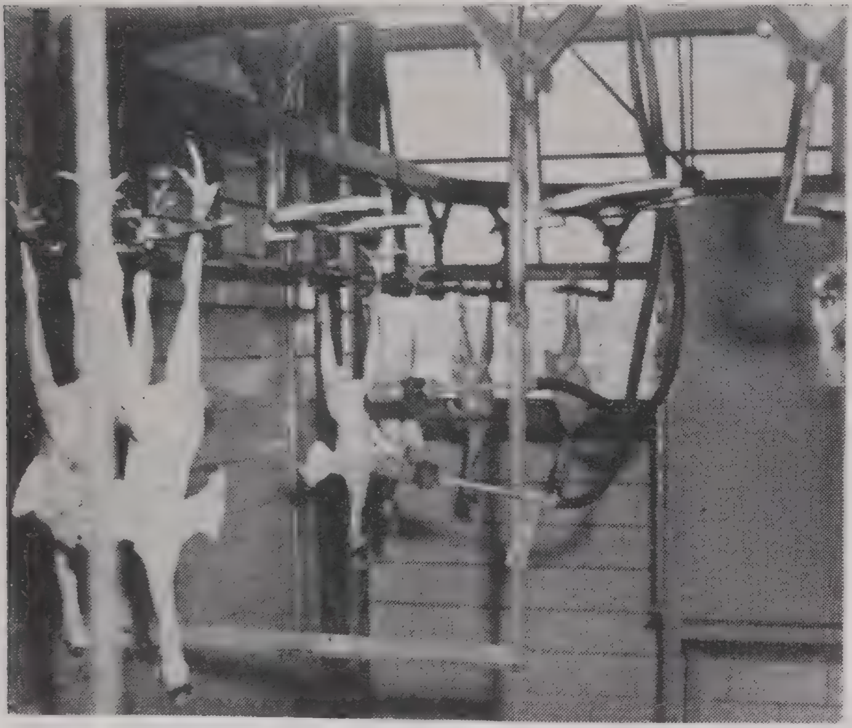
Basis			
Belt area........	20 sq. ft.	100 sq. ft.	400 sq. ft.
Dryer capacity........	5.4 lb./hr.	27 lb. dry/hr.	108 lb./hr.
Water condensed........	10 lb./hr.	50 lb./hr.	200 lb./hr.
Plant invest.*........	$16,000	$55,000	$115,000
Operating Costs			
Power & water........	$ .30	$ .60	$1.70
Heat........	.06	.30	1.60**
Labor........	1.25	1.25	1.25
Amort........	.26	.92	1.92
Total Cost........	$1.87	$3.07	$6.47
Cost/lb. dry........	$ .36	.114	.060
Cost/lb. water removed........	.187	.0615	.032

* Plant investment figures are for drying a specific substance.
** Includes steam consumption of steam ejectors.

Camera Follows Poultry Dressing Operations

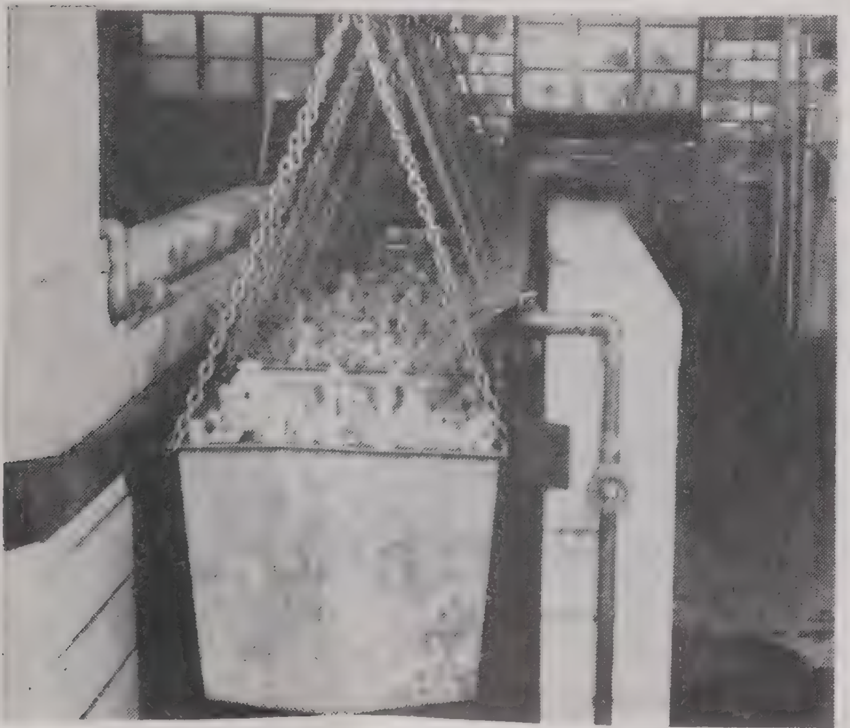
1 **BUYER** checks a consignment of carefully selected, cross-bred chickens, as they move up to processing line.

2 **CHICKENS** are grasped by their legs, removed from crates, and attached to conveyor. Later, they are killed.



5 **AUTOMATIC SINGER** (center) burns off pin feathers. Chickens then travel through spray-cooler (right).

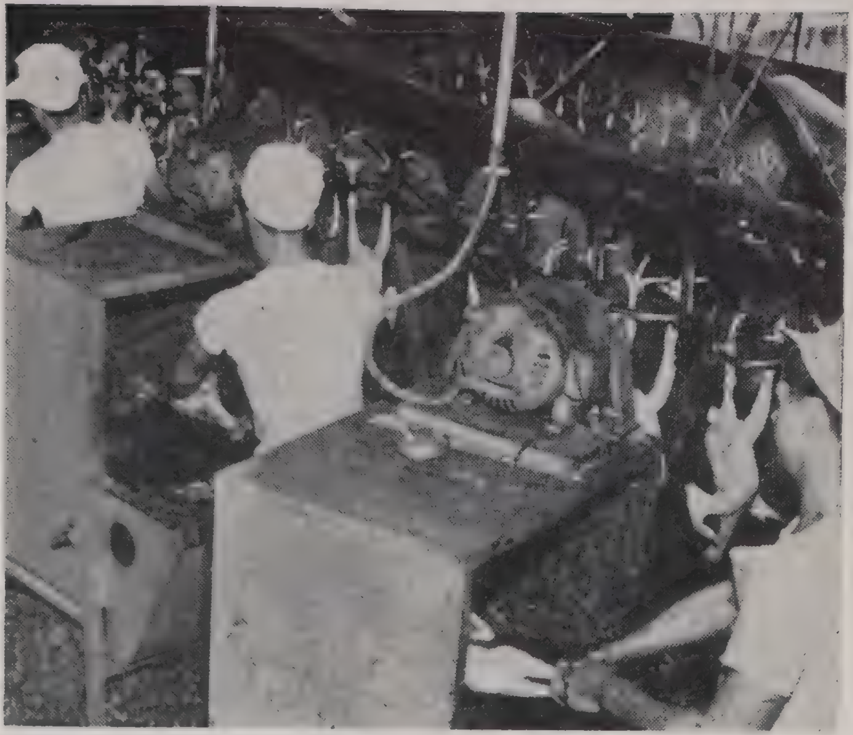
6 **INSPECTOR** looks over chickens for stray feathers. Birds not completely defeathered are returned to pickers.



9 **TUBS** of dressed poultry go through series of water sprays. About 150 gal. of well water is used per minute.

10 **BARRELS** are layer-packed with dressed poultry and flaked ice. Firm uses 6 tons of flaked ice daily.

3 **LEAVING** hot water bath, birds pass between whirling cylinders of high-speed, rubber-fingered automatic picker.



4 **REMAINING** feathers are removed by hand on rotary pickers. Birds are then put back on conveyor.

7 **AFTER** head and feet removal (background), chickens are chuted to stainless steel table and eviscerated.

8 **DRAWN POULTRY** is packed in rows in perforated aluminum tubs, suspended from an overhead track.

Poultry Processing Speeded on Mechanized Line

Better quality dressed chickens and greater efficiency have been achieved through the installation of advanced equipment and ingenious devices

JOHN V. ZIEMBA
Assistant Editor, "Food Industries"

Thirty-eight white-uniformed workers handle 1,000 chickens an hour at the new $150,000 poultry processing plant, operated in Fredericksburg, Pa., by Grimes & Hauer, one of the largest retailers of dressed poultry in the U. S. In addition, output can be doubled on the same line merely by adding personnel at key positions.

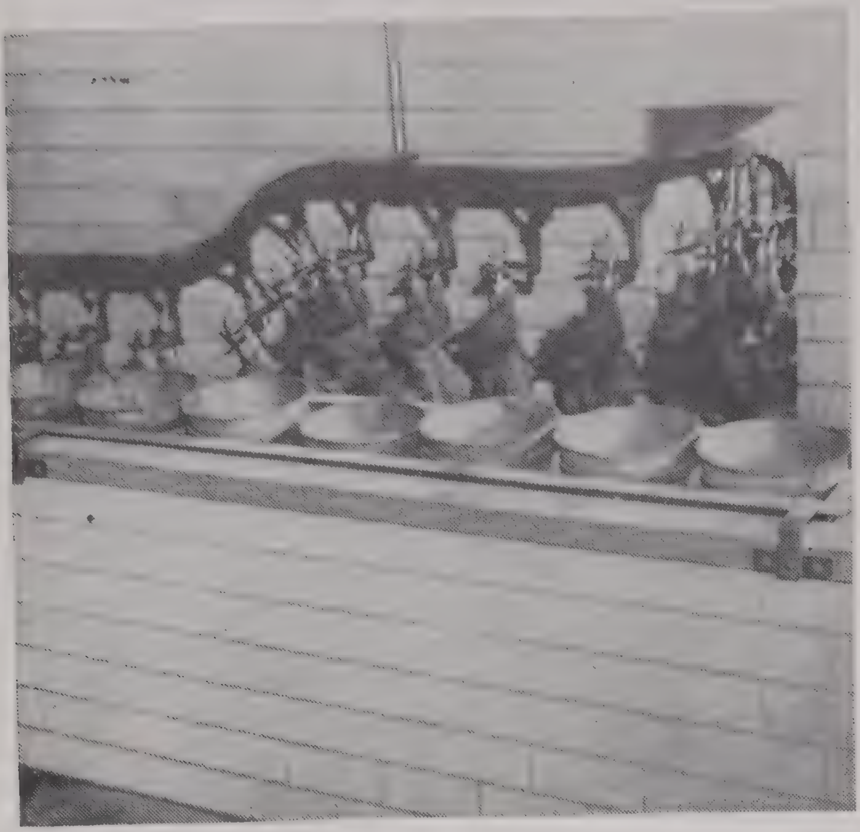
High rate of production has been achieved in four ways: (1) Streamlining the layout of the plant, (2) using modern equipment, (3) applying ingenuity and resourcefulness, and (4) maintaining excellent employee relations.

The changes were made to increase productivity and at the same time improve product quality and cut down on heavy manual work.

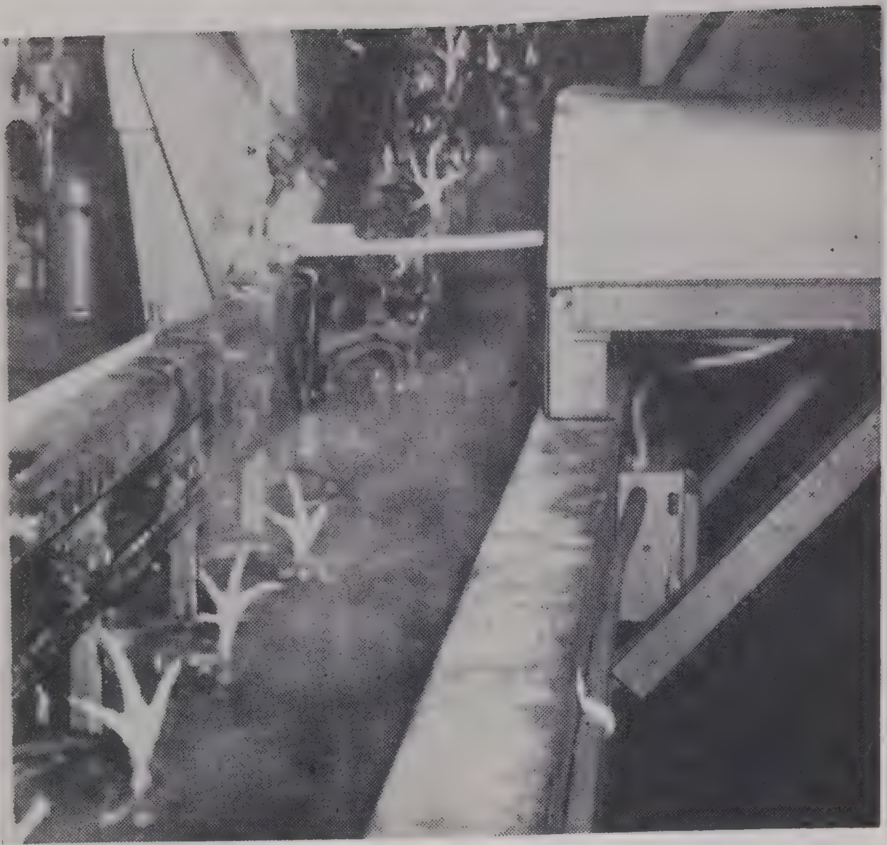
To attain maximum working efficiency, Charlie Grimes designed a T-shaped brick and steel plant. This design enables loading and unloading

ADVANCED FOOD PLANT ENGINEERING
34th of a Series

These Special Devices Aid Production



1 **TO PREVENT** bruises and broken bones, turkeys are put in funnel-shaped buckets to hold them for killing.



2 **EFFECTIVENESS** of scalder is increased by unit (top right) that oscillates conveyor as it passes through bath.

3 **STERILIZING** time has been cut by treadle attachment, to permit barrel's own weight to open steam valve.

4 **HANDLING** of loaded barrels is simplified by lift-truck with special curved arms that "embrace" barrel.

operations to be carried out at each of the three ends of the building without interference.

For example, crates of live chickens are unloaded at one end of the plant, empty barrels are unloaded at a second end, and barrels of iced-down dressed chickens are loaded at the third.

A staggered system of delivering live chickens to the plant permits production lines to operate constantly during shifts. The firm has five trucks each of which picks up 256 crates of live chickens (18 to the crate) from nearby chicken-raising farms. The chickens purchased are, for the most part, cross-bred fowl bringing out the best qualities of New Hampshire Reds and Plymouth Rocks.

Processing operations are arranged with one thought in mind—to cut down on the number of steps workers must take. No one has to walk more than two steps away from his station in performing his duties. Furthermore, each employee is qualified to do any job along the production line.

Conveyors Set the Pace

Handling of poultry has been speeded by the installation of four conveyors that take the chickens through the entire production line—from the unloading of crates of live chickens to the packing of dressed chickens into barrels.

First, a 35-ft. roller conveyor takes the crates of live chickens from trucks to the platform at the start of the production line. Previously, these crates were carried by hand to the platform, where they were stacked. Then, another worker had to lift them onto the platform. Since the roller conveyor has been installed, the carrying and lifting of these heavy crates have been eliminated, resulting in accelerated delivery of crates to the processing line.

After chickens are removed from crates, they are suspended by their feet from specially designed clamps (there are 285 of them) on an overhead endless conveyor.

The 280-ft., adjustable-speed carrier is automatically lubricated to prevent interruptions in processing due to faulty oiling. Some idea of the size of this conveyor may be gained from the fact that 185 chickens are killed and cleaned before the first one drops onto the saw table.

Here is what happens to the chickens at the nine stations on the defeathering line: (1) Jugular veins are severed; (2) they are bled in an L-shaped, tile trough; (3) then comes scalding in a tile tank. About 70 percent of the feathers are removed (4) as the conveyor travels through an adjustable-speed, rubber-fingered, automatic rotary picker. The birds are subsequently taken off the conveyor long enough to have most of the remaining plumage removed (5) by hand manipulation on a rotary picking machine. The fowl are then returned to the conveyor, where gas burners (6) singe pin feathers; (7) 50-deg. F. water-sprays precool the chickens; (8) inspectors look them over for stray feathers; and (9) they are dropped automatically from the conveyor onto a metal table fitted with a circular saw for cutting off heads and feet.

Eviscerating Table Has Conveyor

Then, the chickens are alternately placed on two stainless steel chutes that take them to the third conveyor. This slotted, stainless-steel conveyor is 3 ft. wide and is divided by iron guide pipes into three lanes—the two outside lanes for chickens as they arrive from the chutes, and the center one for eviscerated birds. Three sets of water sprays further cool the fowl.

On each side of the eviscerating table, twelve workers cut the chickens, and remove their entrails, hearts, and gizzards. The entrails are dropped through a chute into stainless steel containers below the table. Hearts and gizzards are washed in tanks of running water (next to each operator) and put back into the chickens, which are then placed on the middle lane of the conveyor.

Birds Get 30-Minute Wash

The fourth conveyor is at the end of the eviscerating table. Here, an operator inspects the birds for bruises and torn flesh, then loads them into perforated aluminum tubs of the same volume as a barrel. The tubs are suspended from an overhead track.

As the tubs move along the overhead track, they pass through a series of cold-water sprays which use 150 gal. of water a minute. The water is piped from a 200-ft. well. After the chickens have been sprayed for about 30 min., the tubs are drained. The birds are then weighed on a scale built into the overhead track.

The chickens—their body heat completely dissipated in passage through the three precooling installations—are packed in sterilized barrels between layers of flaked ice. Six tons of flaked ice are used daily, produced by the firm's ice-making machine.

The loaded barrels, weighing about 450 lb. each, are transported by electric fork-lift truck either to the firm's delivery trucks or to the 33-deg.-F. cold storage room.

About the Special Devices . . .

Resourcefulness is apparent in many of the plant operations. The effectiveness of the hot water bath (132 to 135 deg. F.) has been increased by a simple device, fashioned from the rocker arm of a discarded family washing machine and an automobile steering link. By oscillating the conveyor as it passes through the hot water bath, this unit swishes chickens back and forth to work the water under the feathers and close to the skin.

To cut down on the time required to open and close the steam valve in sterilizing empty barrels, a special treadle was devised to permit the barrel's own weight to open the valve. The valve closes when the barrel is lifted off the treadle.

Dissatisfied with the flat prongs on the lift truck used to triple-stack barreled chickens in the cold storage room, Grimes developed curved arms which "embrace" the barrel. The difficulty with the flat prongs was that one man had to tilt the barrels so that the flat prongs could get under them. Now, the lift-truck manufacturer is advertising new models with the same curved arms.

To make it easy to remove chickens clamped on the 280-ft. conveyor, a special automatic release was designed. This simple release has also stepped up production considerably. Previously, the worker who cut off the feet and heads had to stop his work to remove chickens from the clamps as they came to his station. This, of course, interrupted the flow of birds to the eviscerating table.

Because turkeys are heavier than chickens, they cannot be killed on the conveyor line. In their struggles, they spatter blood about themselves and the walls, with the risk of skin tears and bruises and disruption of the steady production flow. Heavy-weight turkeys often break their legs and wings—even damage the overhead conveyor.

To lick this problem in his plant, Grimes devised cone-shaped buckets, open at top and bottom, to hold the turkeys securely from just before their jugulars are cut until after they have been bled in the bleeding trough. And he fashioned a small cone for small turkeys to fit inside the larger one. The line can handle 420 turkeys an hour.

Another simple innovation has facilitated the loading of barrels of dressed chickens into trucks of any height. Trucks above or below the loading platform formerly had to be hand-loaded by three workers. Now there is a steel aligning plate bolted to the floor of the loading platform. The plate can be swung over the end of the platform at any angle to the floor of a truck. This simple device permits fork-lift trucks to load barrels of chickens directly into delivery vehicles, thus doing away with the need for the two additional workers previously required.

By installing its own flake ice-making machine, the company has saved much labor. First, the handling and crushing of large blocks of ice has been eliminated. Second, handling of barrels of dressed chicken packed in flaked ice is easier—the barrels are about 20 percent lighter than those packed with crushed ice. And unlike crushed ice, flaked ice does not work out of the tops of the barrels during handling and spill over the help. Third, clerks at retail stores find it easier to take the chickens from the barrels. And they do not nick their hands and figures.

The firm has found another advantage in the use of flaked ice—chickens are kept better. Flaked ice covers the birds more completely than crushed ice, thus keeping them colder. And because of the blanket-like covering created by flaked ice, the chickens arrive at the store with fewer bruises.

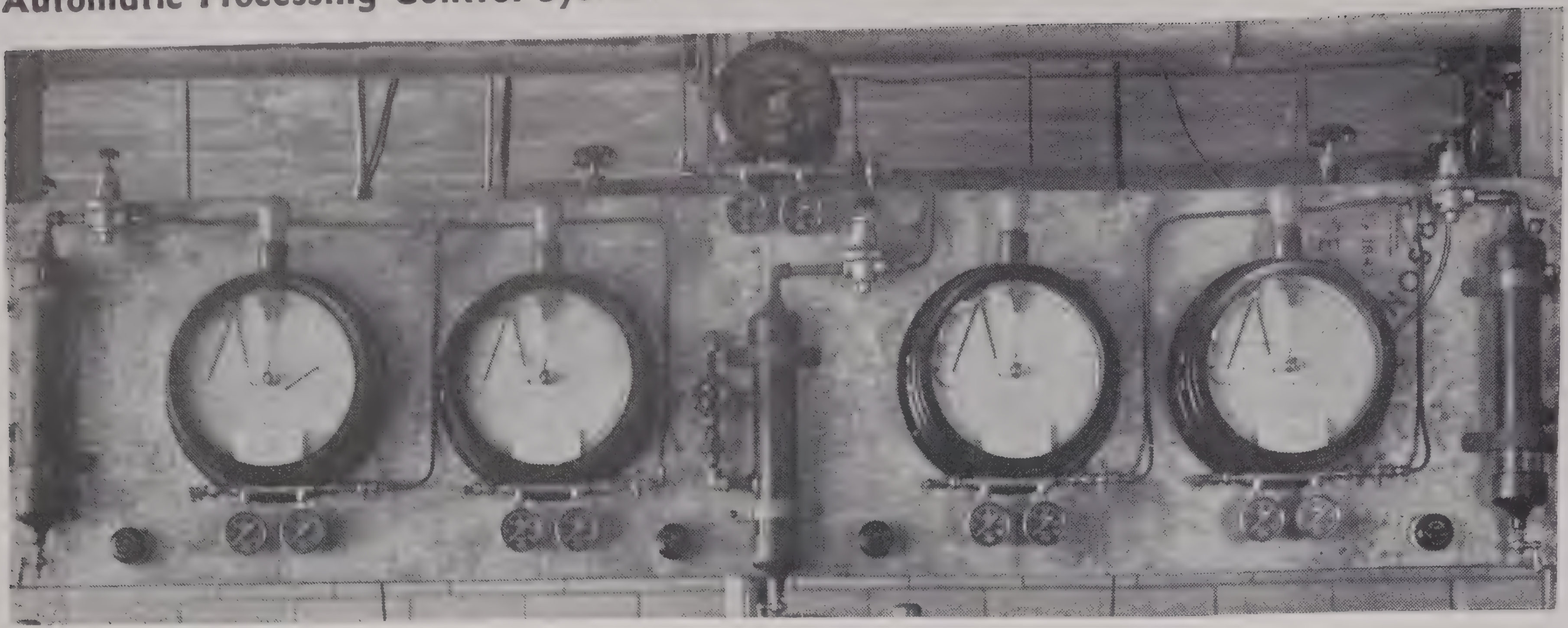
Good Employee Relations

Excellent employee relations also aids in maintaining high productivity. Workers receive 10-min. rest periods every 2 hours. Also, a public address system brings musical programs to them at intervals throughout the day. Shower, locker, and recreation rooms have been provided, and an outdoor recreation area is being prepared on the plant grounds. Employees can use all recreational facilities—indoor or outdoor—during rest and lunch periods and even after their working hours.

In addition, a baseball field, complete with grandstand and players' dugouts, has been constructed for a "midget league" boys' baseball team sponsored by the firm. All proceeds from this activity will be contributed to the annual March of Dimes.

Making work easy for the personnel is the most important consideration at this plant. Charlie Grimes and Lloyd Hauer have done it by installing conveyors to reduce strenuous work, and machines to make jobs less tedious.

Automatic Processing Control System in Action



CONTROL INSTRUMENTS in this system are used for processing and pressure cooling in retorts. Temperature is accurately controlled throughout cooking period, thus preventing spoilage due to under- or over-sterilization.

And Two Air-Operated Circuits Which Make It Tick

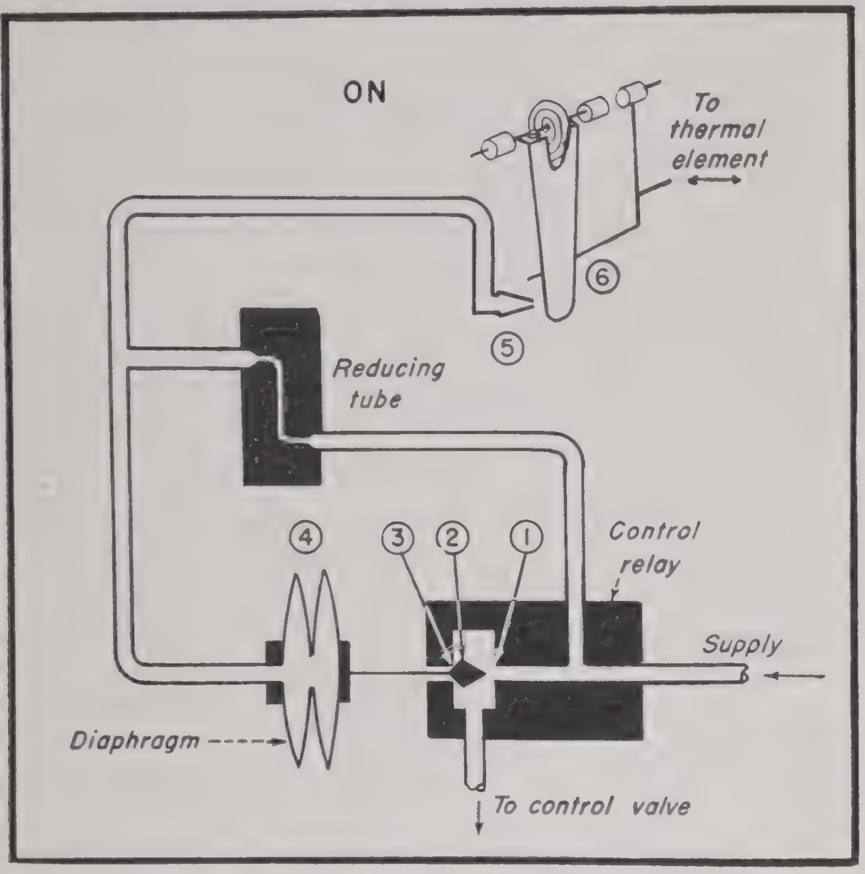

ON
To thermal element
⑥
⑤
Reducing tube
④
③
②
①
Control relay
Supply
Diaphragm
To control valve

FIG. 1. ON-OFF CONTROLLER operates about a point and opens or closes the valve completely.

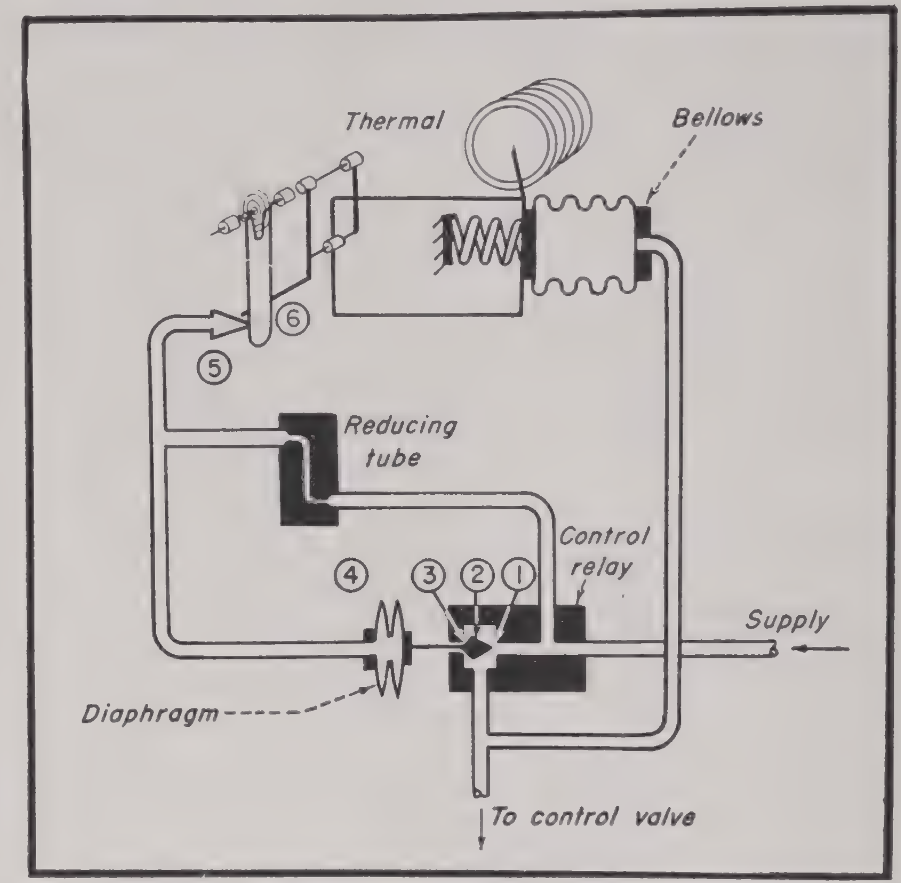

Thermal
Bellows
⑥
⑤
Reducing tube
Control relay
④
③
②
①
Supply
Diaphragm
To control valve

FIG. 2. PROPORTIONAL CONTROLLER functions through a zone about a point, opening the valve gradually.

Control Devices Up Output, Boost Quality, Cut Costs

—Hence the foresighted processor should carefully weigh the facts detailed here. For they will help him select proper controls to improve his operations.

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Food-processing instrumentation has brought to the industry products of higher quality and uniformity. And it has increased production and lowered operating costs. Today, therefore, control instruments are considered essential to efficient and quality operation.

However, attainment of these results in the food plant calls for careful selection of the proper control system. And to make this selection requires a fundamental knowledge of the types of controllers and how and why they operate.

Automatic control may be defined as the automatic balancing of supply against demand over a period of time. The number of types of air-operated controllers has increased rapidly during the last few years. This is due to the growth of the science of control and its adoption by industry for virtually every type of process now being used.

Air-operated automatic controllers are often classified into five types: (1) On-off, (2) proportional, (3) proportional with reset, (4) proportional with derivatives, and (5) proportional with reset and derivative.

Actually, however, there is only one basic type—the proportional. The on-off controller is a special case having, essentially, a zero proportional band and utilizing its own characteristic construction. The reset and/or derivative features are added to the simple proportional controller to adapt the instrument to particular process conditions.

Only the on-off controller and the simple proportional controller have extensive application in the canning industry at the present time. Consequently, this article will be confined to these two instruments, with but superficial treatment of the additional refinements of proportional control.

The first automatic controllers were essentially of the on-off type. As the name suggests, an on-off controller might be employed to open a valve to admit heat when the temperature is too low, and shut the valve when the temperature is too high. For the majority of industrial processes, this was, and still is, the simplest and most economical control.

However, some processes were found to have conditions which made good control impossible with on-off action. Accordingly, a proportional controller was developed to handle these cases. Instead of opening or closing the valve at a temperature, this instrument produced a varying amount of valve opening for varying temperature, so that the valve is partly open all of the time, rather than being fully open or shut.

On processes that require a large degree of proportioning action (wide proportional band), and in which the valve opening must vary greatly, an ordinary proportional controller will not hold the temperature within very close limits. To meet this problem, the proportional with reset controller was developed. Its action is such that it continually alters the valve position as long as there is any difference between pen and control point settings.

Whereas the on-off unit controls about a definite point (the desired temperature or other variable it is maintaining), the proportional unit controls anywhere within a band (the proportional band set in the instrument). A little imagination will show that an instrument which controls or maintains a process anywhere within a specified band will not be satisfactory when the proportional band is large or when extremely close control is required. The amount the controlled variable wanders from the desired control point is influenced by the width of the control band and the valve opening required.

The proportional with reset controller automatically moves the proportional band up and down scale about the control point and permits the instrument to control the process at the control point instead of over a band. Thus, whenever wide variations in load are encountered and extremely accurate control is required with proportional action on the valve, a proportional with reset controller must be used.

Choice of Proper System

Before proceeding with the various control systems, it is well to consider when a particular type of control should be used. Every control operation, manual or automatic, is really one of controlling rate of flow. A temperature controller, for example, controls the rate of flow of Btu.'s to maintain a temperature.

When a process is analyzed solely from the number of Btu.'s involved, it is found that a certain number of Btu.'s are employed in the process, a certain number leave, and if the process is controlled, a new supply is added equal in number to those which left. The number employed in the process is the capacity, the number leaving is the demand, and the number being added is the supply.

Capacity of the system should be further classified into the supply-side and the demand-side. The supply-side is the capacity of the system between the control valve and the product being controlled, while the demand-side is the capacity of that portion of the system actually containing the product being controlled. These two capacities must be kept in mind if the proper kind of control is to be applied.

In addition to the quantities of Btu.'s, we must also consider their distribution. In a controlled process, the Btu.'s should be evenly distributed throughout the process. The time taken for newly added Btu.'s to become distributed throughout the process—and the nature of the process reaction—is called the lag. In some processes, this lag is negligible, whereas in others it is considerable and greatly influences the type of control required. In this article we will assume that if lag is not mentioned, its effect is negligible.

A process that has a large demand-side capacity and a relatively small supply-side capacity can generally be controlled by an intermittent supply—that is, by on-off control. Imagine that the demand-side capacity (expressed in Btu.'s) exceeds the demand by 50 fold or more. It is apparent that the demand for Btu.'s will not exhaust the demand-side capacity so long as it is intermittently replenished with Btu.'s.

In other words, the demand-side capacity is large enough to absorb the fluctuations in demand and supply. The intermittent operation of the control valve, opening and shutting at intervals, will maintain the demand-side capacity at a satisfactory and normal operating point. An on-off controller will give complete satisfaction.

On the other hand, a process in which the demand-side capacity (expressed in Btu.'s) is small, in relation to the demand for Btu.'s—cannot be satisfactorily controlled by on-off action. In simplest terms, the effect of the fluctuations of heat represents a series of ups and downs, or a record of fluctuating temperatures, unsatisfactory for steady, normal operating conditions.

But, if the addition of heat is made continuously, and in varying proportion, according to the demand, the fluctuation of temperatures will be reduced. The proportional action will give this type of control and produce uniform temperatures.

A simple example that is comparable with process problems is the difference between a shower bath and a tub bath. Obviously, a bath tub full of warm water has a very large demand-side capacity with relation to the supply-side capacity, and an intermittent addition of hot and cold water will not change the temperature of the bath appreciably. On-off control is entirely satisfactory. But in an ordinary shower bath, the demand-side capacity is represented by the water in the mixing valve and in the line to the shower head. This storage volume is so small in comparison to the supply capacity (in the hot and cold water systems) that intermittent additions of hot and cold water would give widely fluctuating temperatures. A continuously open valve, effected by proportional control is required to give uniform temperatures.

The important distinction between these two analogies is the difference in their demand-side capacity to supply-side capacity ratio. Obviously, a shower bath fed from an overhead tank of warm water would have the same characteristics as a tub bath, and the temperature could be controlled by on-off control on the tank.

One essential for successful on-off control is that the effect of a change in heat supply should be promptly felt at the point of temperature measurement. The process equipment may be such that the effect of a change in heat supply is retarded considerably in causing a change in temperature at the point of measurement. In such a case, large over-accumulations of heat may result if on-off control is used. If there is any considerable delay between

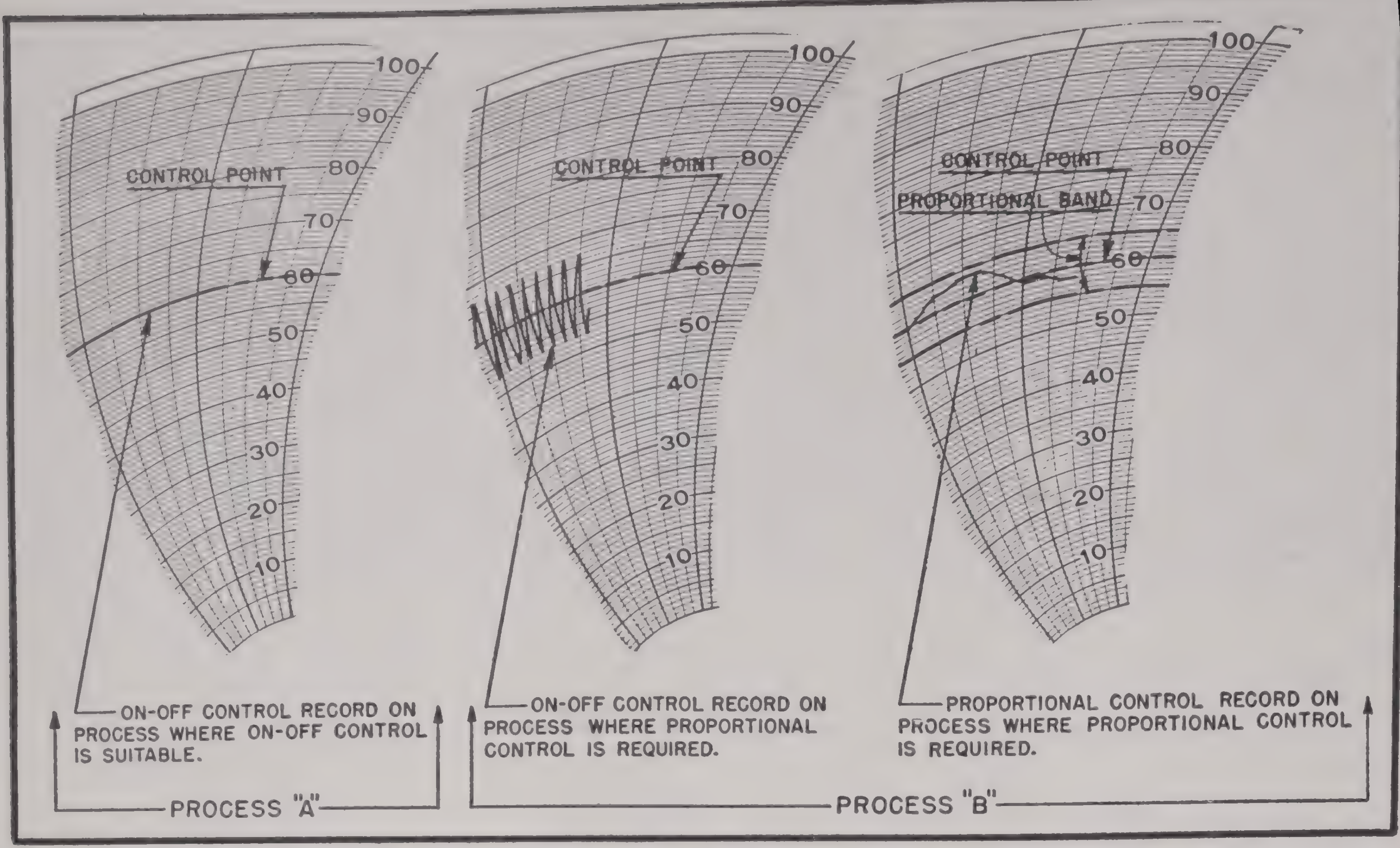

FIG. 3. RECORDS illustrate correct and incorrect selection. Process "A": Proper controller used, on-off operating about a point. Process "B", left chart: Wrong, because point instrument is on zone operation. Right chart: Correct, with band instrument on zone operation. Widths of proportional bands are variable and can be set as required.

a change in rate of heat supply and its effect on the temperature measuring element, it is probable that proportional control will be necessary.

While such factors influence selection of the proper type of control system, their presence is negligible in comparison to the relation of demand-side capacity to demand in a large percentage of applications. On-off control should be used on all processes where this type of control will be satisfactory. It is simpler, less expensive, and generally needs little attention.

On-Off Control Used on Retort

Among the innumerable controlled industrial processes, there are examples which represent every possible combination of capacity and demand, with or without process lags. However, most canning processes represent elementary control problems. The retort, for instance, has a large demand-side capacity to supply-side capacity ratio—like the bath tub in the analogy given—and the lag is relatively small and unimportant, since the admission of heat (steam) is felt almost immediately throughout the retort. Therefore, since the retort is an ideal application for on-off control, on-off it should be—without the maintenance and expense of a more complex system.

Now that an on-off controller has been decided on, the next step is the development of the on-off control mechanism. This consists primarily of a small pressure relay which admits air pressure to the diaphragm motor of a control valve, or vents the diaphragm motor to atmosphere. The sensitive measuring system (we will assume it to be a thermal system in this case) should not be required to do any of the mechanical work of controlling, but should be left free to produce reliable readings of the actual controlled temperature.

Fig. 1 illustrates in simplified form the air circuit of a typical on-off controller. For our purpose we will assume the temperature controller to be on a retort and that the steam control valve is of the air-to-open type. Items 1, 2, 3 and 4 on the diagram are all part of the small pressure relay. Item 5 is a small air nozzle attached to the movement bracket that carries the controller index setting arm. This arm, or pointer, is the one set by the operator to the desired temperature. Thus, if the index arm is moved up or down the scale, so does the nozzle.

Item 6 is a small flapper attached to the movement bracket that carries the temperature pen, or pointer. Thus, if the temperature moves up or down the scale, the flapper moves likewise. The nozzle and flapper are initially aligned so that the flapper is tangent to the nozzle (just touches) when the measuring pen is directly over the index pointer.

As illustrated in Fig. 1, the temperature is below the control point. Notice that in the control relay the small valve (2) operated by the diaphragm (4) has two seats (1) and (3). The flapper (6) is away from the air nozzle (5), allowing the air in the system to bleed, resulting in zero pressure in diaphragm (4).

When the diaphragm is deflated, valve (2) is seated at (3) and the air supply passes through seat (1) to the diaphragm motor that opens the control valves. This is the situation whenever the temperature is below the control point. The reducing tube is inserted in the air line from the relay to the actuating air system (air line between diaphragm and nozzle) to reduce the air flow in this system. Supply air pressure to the instrument is not required to operate this actuating system, and this type of construction increases the sensitivity of the instrument.

When the temperature reaches the control point, the flapper valve (6), that is moved by the thermal system, covers the nozzle (5). This creates a back pressure which expands the diaphragm (4) so that the pilot valve (2) unseats at (3) and seats at (1). The air supply to the control valve bleeds to atmosphere through (3), and the control valve closes.

All of the above action takes place almost instantaneously. A change in temperature, so slight as to be hardly readable will cause the flapper valve to open or close the nozzle, which puts maximum or minimum air pressure on the diaphragm motor of the control valve. This opens or closes the valve quickly and gives the close, on-the-line control which is characteristic of a good on-off system.

In the above discussion, an air-to-open (spring closing) control valve was assumed, and the control relay shown in Fig. 1 is the so-called "direct" type (air on relay diaphragm shuts off air to control valve). If the control valve had been of the air-to-close type (spring opening), a so-called "reverse" relay would have been used. This is similar to the "direct" relay, except that air on the relay diaphragm places air on the control valve instead of cutting it off.

Proportional Controller

As mentioned previously, in proportional action, the instrument controls the amount of valve opening, depending on the demand. If more heat is required, the valve is opened farther.

Instead of having the valve open or closed at the control point, as in on-off action, the valve must open or close gradually through a zone about the control point. This zone is the proportional band, and the temperature must move completely through this proportional band to move the valve from fully open to fully closed.

The basic construction and operation of the proportional controller is the same as that of the on-off type previously described. The principal difference is the addition of a bellows—installed in the air system as shown in Fig. 2.

As shown, the controller output air (air line to control valve) is connected to the bellows, and the motion of the bellows caused by this air pressure is transmitted to the flapper bracket by means of a link. This additional force positioning the flapper causes the flapper valve to operate in a manner different from that in the on-off controller. This is the reason why a proportional system gives the type of control it does.

Thus, the action of the flapper valve is governed by the pressure on the diaphragm motor of the control valve, as well as by the position of the sensitive measuring element, and the measurement deviations are counter-balanced by the change in valve motor pressure.

In the proportional, if the flapper is held tangent to the air nozzle, a constant air leak will result, and the valve will remain stationary. Should the demand increase, the temperature will fall and the measuring element will tend to move the flapper (6) away from the nozzle (5), thereby producing increased pressure on the diaphragm motor.

This would open the control valve, except that this increased pressure also moves the bellows, which is connected to the air line to the diaphragm motor of the control valve. The bellows maintains the flapper at a position tangent to the nozzle, bringing the air system to a new balance at a higher pressure. The control valve naturally assumes a corresponding new position. In actual operation, this action is simultaneous, not in steps as described.

Action of the bellows is to maintain the flapper tangent to the nozzle. As the measuring element tends to move the flapper, the change in air pressure causes the bellows to return the flapper to its original position. This reaction builds up or reduces the air pressure on the diaphragm motor to maintain the amount of valve opening necessary to counterbalance the demand. Smooth proportional control is the result.

Width of the proportional band (percent of scale over which measuring pen moves to change the valve from open to closed), can be easily changed by altering the lever lengths between the bellows and the flapper bracket.

It should be emphasized that in any proportional controller the instrument controls within a zone—and not about a point, as does the on-off controller. Fig. 3 illustrates a typical on-off control record on a process where on-off control is suitable, an on-off control record on a process requiring proportional control, and a typical proportional control record on a process requiring proportional control.

Auxiliaries Less Applicable

The control systems for proportional with reset and/or derivative controllers will not be detailed here, since these auxiliary control features are generally not required in present day canning instrumentation. In short, the basic fundamentals already given cover the instruments required for most canning operations. The theory described applies to the instruments of any manufacturer, for the difference between the instruments of one company and those of another is the manner in which the theory has been put to practical use. Also, some companies have partially limited their line of instruments to certain types of control, while others provide a complete line. The additional features offered vary among the different manufacturers.

Among such additional features are the dual controller, the duplex controller, controllers which also time the process, and automatic signaling and switching devices.

As the name implies, a dual controller contains two complete measuring and controlling systems in one instrument case. The two systems are each complete within themselves and may both control the same type of variable or different types (such as the dual temperature-pressure controller).

The duplex controller has two complete control systems, both actuated by one measuring system. This type of instrument is particularly adaptable to controlling both the air and relief control valves on a retort, with only one pressure measurement required. The two types are functionally different and each has its own field of application.

Controllers which also time the process are available in many different types, some of which are more automatic than others. However, most of them time the process in some manner, and at the end of a predetermined time either signal the operator, shut down the process, or both.

On canning retorts, it is imperative that the instrument does not start timing the cook until the correct cook temperature has been reached. Some instruments do this automatically. Automatic signaling and switching devices are just what their names imply.

INSTRUMENT applications in a malt house pilot plant. The control devices provide the vital data necessary for developing a commercial operation.

CONTRACT
JELLY
Co-Op
INTERSTATE
STATE
Good Old Ca-Ca-Pa-On
STURGEON BAY
PATENT APPLICATION
MISBRANDED
ADULTERATED

Ten Legal Decisions Worth Knowing

These higher-court interpretations are packed with meaningful tips for food processors who would avoid, or successfully terminate, litigation

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It will always benefit the food processor if he makes it his business to strike up an acquaintance—and even a passing acquaintance is helpful—with the various fundamental legal factors pertinent to his operations.

For the time may come when he makes the sad discovery that hot water isn't just something used on the production line. It can also be something his company can get into.

His company's knowledge of the legal aspects—call it the "know-what"—will be of aid, "before the fact," in steering clear of trouble. And it is here that information regarding other cases in the field, and their higher-court disposition, can play an important part.

Accordingly, we will brief ten of the latest cases:

Didn't Know, But Liable Anyway

Generally speaking, the Federal Food, Drug & Cosmetic Act relates exclusively to interstate commerce shipments. However, food products, if misbranded or adulterated, cannot be lawfully sold to a purchaser who may redistribute the products in interstate commerce.

For example, in *United States v. Walsh,* (67 S. Ct. 1283) it was shown that a manufacturer sold and shipped in interstate commerce a shipment of products. The products were allegedly misbranded and adulterated.

The Supreme Court of the United States held the sales unlawful, although the manufacturer did not know that the purchaser intended to sell and distribute the products in interstate commerce. The court said:

"The commerce clause of the Constitution is not to be interpreted so as to deny to Congress the power to make effective its regulation of interstate commerce."

Incidentally, this subject of interstate commerce is a reminder of the fact that careful attention to the meaning of basic terms is always in order. Court interpretations commonly bear on definitions.

For instance, a higher court recently held that certain seafood imported into the United States was subject to the Federal Food, Drug & Cosmetic Act. The case was *Fish v. United States* (168 Fed. 2nd. 361), wherein a consignee appealed the condemnation of a shipment of seafood by U. S. agents.

The testimony showed that the fish, declared to be infested with parasitic worms, had been shipped from Winnipeg, Manitoba, Canada, to Detroit, Mich. But the consignee argued that the shipment was not in "interstate commerce," and that therefore the shipment was not affected by the Federal Food, Drug & Cosmetic Act.

Nevertheless, the higher court approved the seizure and condemnation, saying:

"The term 'interstate commerce' means commerce between any state or territory and *any* place outside thereof."

Gets "Turn Down" On His Export Idea

Our laws do permit manufacturers of food products to ship adulterated goods to foreign countries under certain circumstances. However, adulterated foods *originally intended* for sale to purchasers in the United States will be seized, condemned and destroyed by the United States government, and the manufacturer cannot transfer the shipment to a foreign country.

For instance, in *United States v. Kent Food Corp.* (168 Fed. 2d 632), it was shown that a clause in the Federal Food, Drug & Cosmetic Act permits manufacturers to export adulterated food products. This clause states that a food "intended for export shall not be deemed to be adulterated or misbranded if it (1) accords to the specifications of the foreign purchaser, (2) is not in conflict with the laws of the country to which it is intended for export, and (3) is labeled on the outside of the shipping package to show that it is intended for export."

The United States seized 1,117 cases, each containing 24 bottles of an article labeled, "Michigan Brand Grade-A Tomato Catsup, Contents 14 Oz. Avoir.," for condemnation as adulterated food in interstate commerce in violation of the Act.

During the trial, the manufacturer appealed to the higher court to release the product so that it could be shipped to purchasers in a foreign country. The higher court refused to approve the release of the catsup, saying:

"There is nowhere disclosed an intention that a violator of the Act may avoid the consequences of his wrong by then exporting the outlawed goods to some foreign country which will receive them."

The Rescue of Ca-Ca-Pa-On

Modern higher courts consistently hold that *ordinary* statements or claims of the quality of food, or similar products, are not legal "misbranding".

For illustration, in *United States v. Five Cases of Capon Springs Water* (62 Fed. Supp. 736), U. S. agents contended that mineral water was misbranded in that the labels on the bottles contained statements which were false and misleading. The following wording appeared: "Rebuilds As It Cleanses..." "The Indians Called It Ca-Ca-Pa-On —'Health Water' . . ." ". . . beneficial in restoring the normal activity of the kidneys and bowels."

The U. S. District Court refused to hold that these statements were false or misleading. This court said:

"We see nothing in the label in this case which would justify a finding that it was fraudulent."

When Is a "Contract" Not a Contract?

Today the higher courts consistently hold that a *valid* and enforceable contract *never* is made unless an offer submitted by one party is *unconditionally* accepted by the other party. Any slight difference, suggestion, or demand by a seller who intends to accept the purchaser's offers —such as requesting the purchaser to make payment in a certain manner—is *"conditional"* and not unconditional acceptance.

In *United States v. Braunstein* (75 Fed. Supp. 137), it was shown that a company accepted an invitation to bid on raisins unfit for human consumption but which could be converted into alcohol. The company's agent offered 10c. per lb. for 9,599 of the 25-lb. boxes of raisins. The seller sent the company a telegram accepting the offer, requesting shipping instructions for the raisins and also asking that a certified check be forwarded as payment.

In subsequent litigation, the higher court held that no valid contract existed—because the seller had *not* unconditionally accepted the purchaser's offer, since the seller had specified how the purchaser must pay the money for the raisins.

Also, the higher court held that since the purchaser had *not* agreed to the seller's request for a certified check, the purchaser had *not* unconditionally accepted the seller's offer. Hence, the purchaser was not liable in damages for failure to accept and pay for the raisins. The court said:

"Acceptance of an offer must be unequivocal, to create a contract, and must comply exactly with the requirements of the offer, and must be positive and unambiguous, and a reply failing to satisfy requirements is a rejection."

Cook Books Beat Him To It

Under no circumstances can an inventor obtain a patent on an old idea, or old combination of elements.

For example, in *Lane* (168 Fed. 2d 551), it was shown that an inventor applied for a patent on a method of making an edible product that comprises impregnating the commodity with a sea-food juice and then cooking it. Another claim in the patent application described a means of making a potato chip that comprises crushing clams to extract their juice, impregnating a slice of potato with the juice, and then frying the slice.

The Court of Customs & Patent Appeals refused to allow the patent, saying that, since the cook books show it to be an old practice to add flavoring juices to potatoes, there was no invention in adding clam juice to potato chips, cracker dough, or any other desired food product.

Also, see *Aeration Processes, Inc. v. Walter Kidde &*

Co., Inc. (170 Fed. 2d. 437). Here the higher court held invalid patent number 2,294,172 for making aerated food products, containing cream, by use of nitrous oxide.

Dangers Have to Be Imminent

Recently, a higher court held that no seller of food products is liable when defects in containers are not imminently dangerous.

A case in point is *Hartford v. Anchor Corp.* (55 Atl. 2d. 148), which concerned a company that manufactures a glass jar for packing food. This jar has a ridge of glass at the mouth—for the purpose of securely affixing a cap.

One day, a housewife was seriously injured when removing the cover of one of these jars. A part of the ridge shattered, and a small piece of the glass was thrown into her left eye.

A higher court refused to hold that the injured woman was entitled to recover damages. It declared that a seller of packed food products is not liable for injuries to purchasers unless the testimony shows *conclusively* that the thing causing the injury was *imminently* dangerous.

While on the subject of these damage cases, it is well to remind the food processor that the "statutes of limitations" may on occasion be cited to avoid liability on a suit.

In *Patterson v. Vincent Corp.* (61 Atl. 2d. 416), the defense pointed out that a state law provided that a suit for the recovery of damages for an injury must be brought within one year from the date of the alleged injuries, and it was shown that the plaintiff's action for damages, because of illness allegedly suffered after eating food processed by the defendant, had not been filed within the year.

Accordingly, the higher court held that the plaintiff was not entitled to a favorable verdict.

In a Jam Over Jelly

Whenever the testimony shows that a seller of food products breached an "implied" or "expressed" warranty of the quality of the products, the purchaser may sue and recover from the seller damages equal to his financial loss resulting from the seller's breach.

In *Bagwell v. Susman* (165 Fed. 2d. 412), the testimony showed that a purchaser bought from a preserving company a large quantity of jellies and preserves. The purchaser then sued for breach of warranty, claiming that the products were unfit for consumption, being of a watery consistency and greatly inferior to the grade commonly bought and represented by the seller.

In holding the seller liable in damages to the purchaser, the higher court said:

"It appears that there was substantial evidence to sustain appellee's (purchaser's) claims, and the jury's verdict. . . . A large amount of the stuff which remained . . . was finally sold by appellee at salvage prices."

For Co-Ops, Yes; For Others, No

Considerable discussion has arisen over this legal question: Is there validity in a contract in which a seller of food products agrees to pay the purchaser a *certain* stated amount, as liquidated damages, for breach of the contract? The answer: *Not unless* the amount of actual damages is fairly proved to equal the liquidated damages specified in the contract.

In *Olson v. Biola Co-Op. Raisin Growers Assn.* (193 Pac. 2d 929), the higher court held as *void* a contract between an ordinary buyer and seller of raisins which contained a clause in which the seller agreed to pay the purchaser a certain amount as liquidated damages, if the quantity of the raisins was below that specified in the contract.

The court declared that, as between ordinary buyers and sellers, the clause could be rendered valid *only* if the testimony proved that the purchaser suffered the amount of damages specified in the contract. On the other hand, the court held that such a clause *is* valid when the contract made with a non-profit cooperating marketing association. The court said:

"The general rule is that a contract which undertakes to fix the amount of damages in anticipation of a breach of an obligation is void... However, an important *exception* to the general rule on the remedy of liquidated damages prevails in the case of a non-profit cooperative marketing association and its members stipulating in advance the amount of damages to be paid upon the breach of an obligation in the particulars of 'the sale or delivery or withholding of products' forming the object of their agreement."

This court said further that the unusual validity of such a liquidated damage provision in a contract arises from the principle that the whole business scheme of the marketing association necessarily depended upon its ability to control products produced by its members. Also, that a member's failure to deliver all of his product to the association and the consequent elements of damage could not be *exactly* estimated.

You Check With the Commissioner On This One

According to a recent higher court, a duly authorized commissioner of agriculture has implied authority to formulate reasonable rules and regulations.

By way of example, in *Stewart v. Mayo* (35 So. 2d 13), it was noted that a state law provides that state inspectors may determine the total soluble solids of citrus fruit by use of a reamer extractor instead of hand extraction in taking juice for tests. This law is concerned with determination of the relative quantity of coloring matter that legally can be added to citrus fruits under the citrus maturity law, and it states that no fruit can be colored except that which passes a "maturity test".

In subsequent litigation, the court held that the commissioner of agriculture may enforce his own rules and regulations as to whether such tests may be made by either hand extraction or a mechanical extractor.

Skip Rand & McNally When Choosing Your Trade-Mark

When is a manufacturer or processor of food liable for unfair competition in respect to trade-marks? Well, you may boil it down to this: If a manufacturer or vendor so distinguishes his products from those of his rival that neither his name nor dress of his container will deceive the public or mislead the common buyer, he is *not* guilty of unfair competition on this score.

Here, we will cite *Fruit Growers Co-Op v. M. W. Miller & Co.* (170 Fed. 2d 834). The Co-Op alleged in its suit that it owns the trade-mark "Sturgeon Bay," and that its opponent in the case had infringed this trade-mark—by placing labels prominently lettered "Sturgeon Bay" on cans containing fresh or processed red sour cherries, and by selling the product so labeled in interstate and intrastate commerce.

But the court decided that "Sturgeon Bay" is merely the common geographical name for the place where the cherries are produced. Therefore, it declared the trade-mark invalid. Also, the court held that the mere fact that the accused prominently displayed the words "Sturgeon Bay" on its labels did not mean that it was guilty of unfair competition—since *no* convincing testimony was given that purchasers were deceived into buying one product when believing they were buying another.

And so it goes. While there can be no denying that each case cited here has its own distinctive elements, each also contains pertinent points of guidance for manufacturers and distributors of food products. It is on that basis that the cases should be studied and the underlying principle in each specifically noted—against that day when the knowledge will come in handy.

DESIRED FLAVOR is attained, keeping quality improved, when the cheese is made the sanitary way, from first to last.

Don't Stop At Body and Texture—Get Flavor

Cottage cheese exemplifies the need to accent taste. Here are "why's" and "how's" of giving it that quality—useful processing tips, whatever food you make

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Much of the work that has been done to raise cottage cheese quality in this country has been concentrated on improvement of the product's physical properties—body, texture and curd particle size. And accordingly, many directions have been issued covering coagulation, manner of cooking, methods of handling and packaging to avoid breakup of curd, and manufacture of acid-type curd as differentiated from the rennet type.

All this is well and good, but the fact is that not enough attention has been paid to the production of cottage cheese of superior flavor. Or to ways and means of preserving that flavor throughout commercial channels of distribution, in order that the last of the cheese consumed will be just as good in flavor as it was on the day it was made.

Consumer demands for certain types of curd, and certain qualities of body and texture, vary from one section of the country to another and from one market to another. And there are some variations in demand as regards flavor—some markets preferring a bland, sweet cream character, others an acid-type cheese possessing plenty of culture aroma.

But all concerned, from manufacturer to consumer, should agree that, whatever the type of curd, and whatever the flavor, the cheese should preserve its freshness for a long time.

Here is where sanitation enters the picture. It holds the key to the problem of keeping quality, and no manufacturer can afford to neglect that problem if he is interested in building his sales and winning increased per capita consumption of his product.

Here, then, let us forget about types of curd—large or small, firm or soft—and devote our attention to the factors that control flavor and keeping quality. If it is the bland, sweet-cream type of flavor that we want, let us see what it is that makes that flavor persist in one batch whereas another deteriorates to the all-too-common stale or yeasty flavor. If our cheese is of the culture-flavor type, why does some of it keep satisfactorily while other samples develop an old, or off, flavor and aroma?

Initial quality, of course, is very important. If we do not have cottage cheese that shows the desired flavor and aroma immediately after manufacture, it's evident we won't have a product that is satisfactory for delivery to the consumer. A number of factors are involved in this question of initial quality.

First Rule to Attain Top Flavor Is "Toss Out These 10"

1. **Incomplete pasteurization**
2. **Contaminated cultures**
3. **Undesirable bacteria during creaming**
4. **Impure curd-wash water**
5. **Wooden utensils**
6. **Improper sterilization**
7. **Air-borne microorganisms**
8. **Hand contamination**
9. **Antiquated handling habits**
10. **Faulty packaging**

"COVER the vats to avoid air-borne organisms." Washable canvas cover (above) has wood frame. Ropes to overhead pulleys facilitate raising and lowering.

"PIPE the water direct." Thus, hose lines, a source of contamination, are eliminated. Here, cold water for washing curd is delivered by means of sanitary tubing.

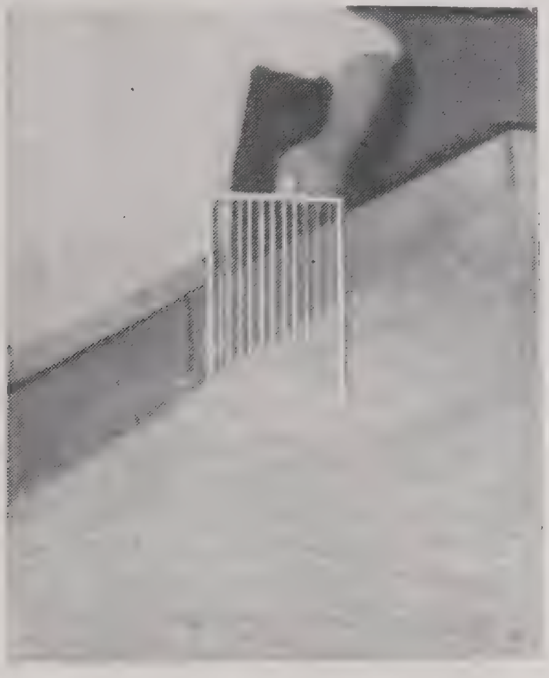
In the first place, a good quality of skim milk must be used. No acidity standard can be set for the country as a whole because of natural variations in total solids content and, therefore, in titratable acidity, due primarily to breed differences. It is fundamental, however, for the skim milk to: (1) Come from milk of reasonably low bacterial count, and (2) have a clean flavor. Difficulties with flavor and even with coagulation are experienced if these standards are not met.

Some plants make use of skim milk separated from route returns. This practice isn't inherently wrong, but it is a common source of trouble because of the abuses in practice. Good, fresh milk, returned to the plant cold room after a few hours on the route trucks, is one thing; a mixture of such milk with old store returns, and especially old cream returns, is very definitely another.

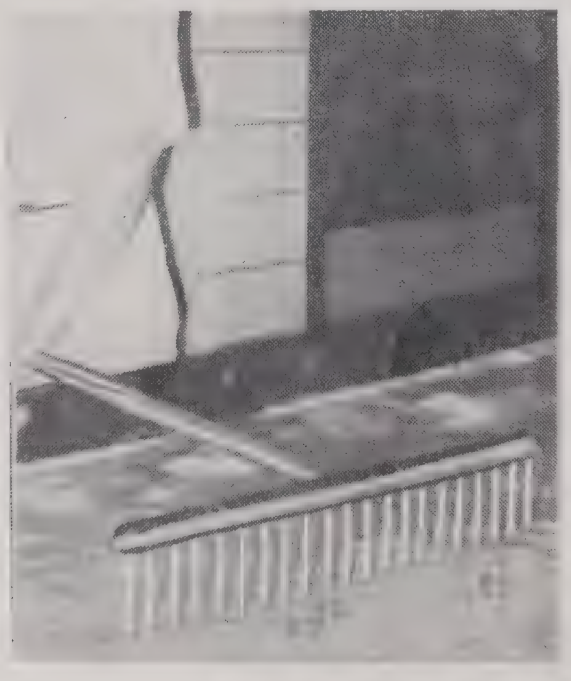
Skim milk separated from the latter type of mixture can never be satisfactory for use in byproducts, especially cottage cheese and buttermilk whose characteristic flavors are so dependent upon a perfectly sweet, low-acid seed-bed for the culture organisms. Very slight off-flavors are intensified in the finished product and result in poor initial quality. Handling of returns must be under very careful control if trouble is to be avoided from this source.

Condensed skim milk and non-fat dried milk are used, either to supplement supplies of fluid skim milk, or as the sole source of milk solids in the cheese. These products, when of high quality, have proved satisfactory for use. But, the dried product should be of the spray process type, since the roller powder gives a cooked or powder flavor to the finished cheese.

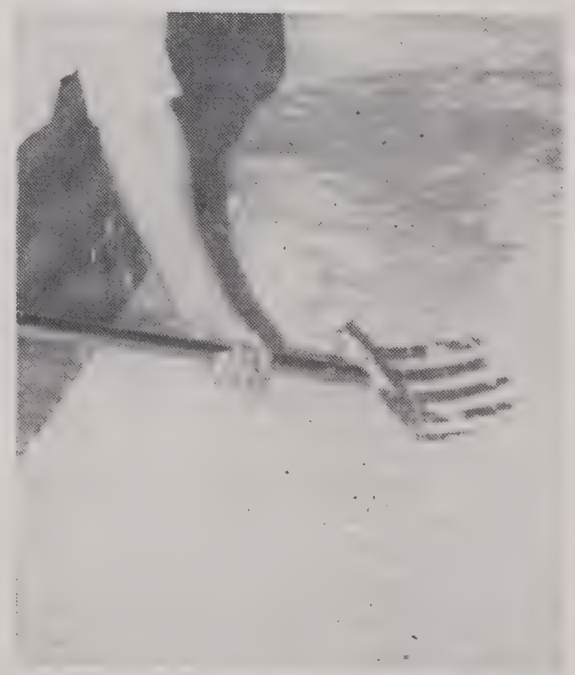
Knife . . .



. . . rake . . .



. . . and fork . . .



. . . are stainless steel to keep out taboo organisms

"**THE CLEAN TRANSFER** averts trouble." This method of removing curd from cans was designed with an eye to sanitation not possible when the cans are inverted.

"**SEAL IN THE FLAVOR** by sealing out the interlopers." Good packaging does it. Here, filler is supplied by pump, insuring a sanitary package.

And it does not possess the solubility of the spray-dried product. Condensed skim, to be used for cottage cheese, should not be made from skim milk that has been preheated above 160 deg. F.

Importance of Good Culture

Another essential for satisfactory initial quality is a good culture. This must be active, and the activity must be retained by transferring at least three times weekly. The small culture should be carried in whole milk, because the flavor produced is then more satisfactory than with skim milk.

This question of assuring quality of culture is an involved subject meriting considerable space; however, a summary of the bare essentials for good culture maintenance must suffice here:

1. *Good Milk.* Whole milk for small culture should have between 12.0 and 12.5 percent total solids, since low-solids milk results in insufficient or flat flavor. There is no advantage in a higher solids content, however. Both whole milk and skim milk (for large culture) should be of superior flavor, free from sediment, and low in bacterial count.

2. *Pasteurization of Milk.* For the small culture, milk may be either sterilized in an autoclave or pressure cooker (15 psi. for 20 min.) or pasteurized (at 180 to 190 F. for 1 hr.). Satisfactory containers are Erlenmeyer flasks, provided with cotton plugs, or parchment or metal-foil closures. Skim milk for the large culture should likewise be pasteurized at 180 to 190 F. for 1 hr.

3. *Sterilization of the Equipment.* Pipettes are best used for transferring culture. They should be kept in metal cases, and sterilized at 15 lb. pressure for 20 min. In the absence of an autoclave or pressure cooker, pipettes may be sterilized in a steam chest under flowing steam for 1 hr. The flasks of milk may also be pasteurized in this manner.

4. *Proper Control of Temperature.* Cultures should be incubated at 71 to 72 F. for 15 to 16 hr. To develop a satisfactory flavor, small cultures may easily carry an acidity of 0.85 percent. And with frequent transfers, this acidity should have no effect on the activity of the culture. Acidities in the large culture can be carried somewhat lower. Flasks of small culture should be chilled promptly after ripening by placing in an ice water bath. Steps in culture control are shown graphically in an accompanying chart.

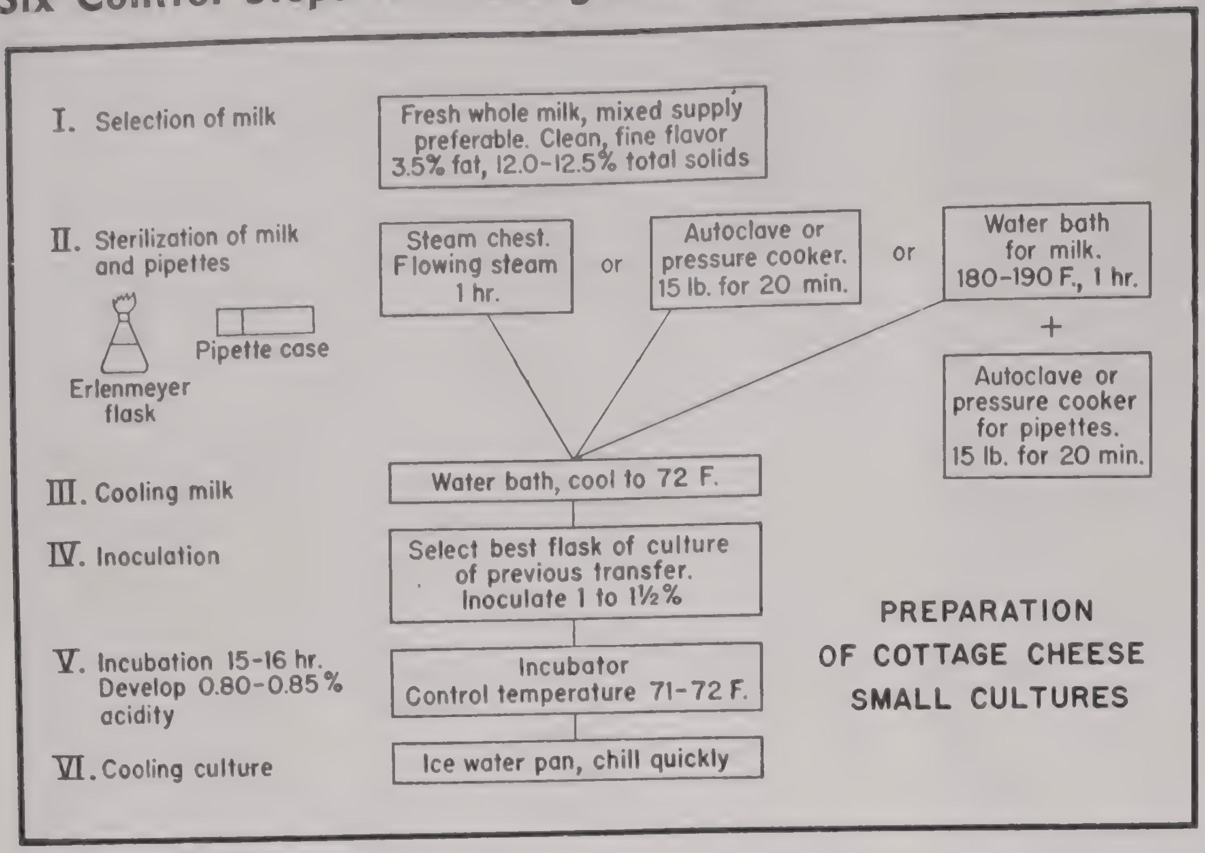
Curd Cooking Demands Care

Cooking calls for regulation to produce the type of curd that is wanted for a particular market. One important rule is: Don't heat too rapidly, thus hardening the exterior of the particles and delaying the expulsion of whey from the interior. Heating should be carried no higher, nor continued any longer, than is absolutely necessary. If the flavor organisms, associated with lactic acid-producing bacteria in the culture, are killed by high temperatures of cooking, flavor will be lacking in the finished cheese. For these organisms continue to act in normal, well-made cheese after manufacture and packaging, enhancing the flavor and aroma.

High Quality Cream Essential

Cream for creaming the curd should be just as good in quality as any table cream. It must be clean in flavor, normal in physical characteristics, and of excellent quality from a bacteriological standpoint. Very often this cream is contaminated with yeasts, molds, coliform organisms, and other types capable of rapid growth at usual storage temperatures. Inferior quality in the cheese results.

Regardless of how acceptable the type of curd may be in any particular market, flavor is a primary consideration. Unfortunately, some consumers have been exposed to yeasty and off-flavored cottage cheese to such an extent, and over such a period of time, that they have come to accept it without audible complaints. But certainly, such a product cannot promote consumption, and it is questionable if people can go from a clean-flavored cottage cheese to an off-flavored prod-



Six Control Steps In Making Small Cultures

I. Selection of milk
Fresh whole milk, mixed supply preferable. Clean, fine flavor 3.5% fat, 12.0-12.5% total solids
II. Sterilization of milk and pipettes
Erlenmeyer flask
Pipette case
Steam chest. Flowing steam 1 hr.
or
Autoclave or pressure cooker. 15 lb. for 20 min.
or
Water bath for milk. 180-190 F., 1 hr.
+
Autoclave or pressure cooker for pipettes. 15 lb. for 20 min.
III. Cooling milk
Water bath, cool to 72 F.
IV. Inoculation
Select best flask of culture of previous transfer. Inoculate 1 to 1½%
V. Incubation 15-16 hr. Develop 0.80-0.85% acidity
Incubator Control temperature 71-72 F.
VI. Cooling culture
Ice water pan, chill quickly
PREPARATION OF COTTAGE CHEESE SMALL CULTURES

uct and not note, and speculate on the lack of uniformity.

In the manufacture of cottage cheese, lactic acid bacteria play a prominent role. Any influence, or factor, that interferes with this dominance of "lactics", or introduces contaminating organisms capable of growth and destruction of the products of these desirable bacteria, must be guarded against if the flavor and aroma of a really good product are to be preserved.

Ten Troubles and Their Remedies

The following paragraphs will consider ten of the more important causes of poor keeping quality in cottage cheese, and remedies will be indicated.

1. *Incomplete Pasteurization.* This applies to both skim milk and cream. Sometimes, continuous pasteurizing systems that lack automatic controls are in use for skim milk, hence efficient pasteurization is entirely dependent upon the personal element. Such systems are definitely hazardous, not only to the quality of the product but also to public health. They should be replaced by equipment provided with proper time and temperature controls.

Recording thermometers should also be provided. And in the case of short-time pasteurizers, the holding tube's length and diameter must be sufficient to give a 16-sec. holding time. A flow diversion valve, with automatic controls, should be used to insure diversion of sub-temperature milk.

An exposure of 143 to 144 F. for 30 min. is commonly used for skim milk by the holding method, and 161 F. for at least 16 sec. by the short-time method. Many of the short-time installations have been made to pasteurize the skim milk at slightly higher temperatures and for slightly longer periods of time—for example, 165 F. for 20 sec.

The phosphatase test should be used in checking both the skim milk and cream. Some plants test each vat that is set. But where there are proper controls over temperature and time of pasteurization, routine tests on each vat two or three times per week serve the purpose. Deficiencies have been found in pasteurizing systems used for skim milk, and the phosphatase test is a valuable checking tool.

2. *Contamination From Wooden Equipment.* From the early days of the cottage cheese industry, wooden utensils have been used in handling and creaming of the curd. Such utensils are still in vogue today, and as long as their use continues we may expect to have contaminated cheese and unsatisfactory keeping quality.

These wooden utensils splinter. Being porous they become impregnated with various types of microbiological life.

They cannot be satisfactorily sterilized by any means. A chlorine solution may be effective on the immediate surface, but it cannot penetrate the pores of the wood. Sterilization in boiling water, while beneficial, is little more than a surface-effective treatment.

Such wooden equipment is a common and potent source of contamination with yeasts, molds, coliform and other types of organisms capable of destroying the initial good flavor of the product and of producing off-flavors. It is extremely important, therefore, that these utensils be replaced with types made of materials that will not be subject to contamination and that will yield to sterilization measures.

Utensils of welded stainless steel, smoothly polished and with no cracks or crevices, offer one answer. Admittedly, they are somewhat expensive, but they should offer many years of service so that the initial cost represents money well spent.

3. *Contaminated Culture or Coagulating Solution.* Sometimes the culture is contaminated through faulty handling, resulting in the introduction of yeasts or molds or other contaminating organisms. Culture should be plated periodically for yeasts, molds and coliform organisms, and if contaminated, should be replaced.

Coagulating solution is sometimes at fault in this respect. It is frequently contaminated by the utensils used in measuring and adding it to the cheese vat. Before use, such utensils should be thoroughly cleaned and sterilized in chlorine solution.

4. *Failure to Cover Cheese Vats* may result in contamination from the air. This may be from dust, air-borne organisms, or in extreme cases from the introduction of flies, gnats, and other insects which not only contaminate the milk, but also may carry through and appear in the finished product.

Air-borne bacteriophage contamination results in slow acid production or even "dead" vats. To avoid this type of trouble, it is good practice to locate the culture propagation work and the culture vats in a separate building or in a separate room some distance from the cheese vats. Spraying the room daily with a 500 ppm. chlorine solution has been an effective control measure.

5. *Hand Contamination.* Many old-time cheese makers like to work down into the vat of curd and whey with their hands and arms and think they cannot make good cheese unless they do. This results in contamination. It is absolutely essential that such practices be eliminated and that all necessary handling of the product be done with utensils.

Commonly used are the pusher for stirring, the rake for handling curd in the vat, the fork for mixing with salt and breaking up lumps, and the shovel for mixing with cream and transferring the curd from the vat into the cheese cans or tins.

All of these utensils are now made of stainless steel, with joints welded and ground smooth. The entire utensil is polished so as to present just as sanitary a surface as any piece of stainless steel dairy equipment. Certain cheese makers find it possible to get along with only two or three of these utensils. These, together with dippers for curd sampling, curd pails, curd hoppers for filling cans, and curd strainers, should be sterilized, either by immersion in chlorine solution of

50 to 100 ppm. for at least 5 min., or by steaming in a cabinet under flowing steam for 1 hr.

6. *Insanitary Practices and Habits.* Upon close examination of the curd-making process, a number of insanitary practices and habits of the operators may come to light. Here are some of the more important ones actually observed:

(a) Placing utensils on the floor between usages. To eliminate this, a stainless steel table or portable rack should be provided, with the top sterilized by chlorine solution.

(b) Water splashing from the floor into containers when using hose.

(c) Faulty changing of pipe lines at cheese vats while filling, thus allowing skim milk to flow over hands.

(d) Use of cleaning brush to wipe off top portion of vat (to facilitate later cleaning) and dipping into whey and brushing after the heating of the curd is completed.

(e) Use of wire basket on floor to catch curd carried out by the wash water, and then returning curd to the vat (where no curd strainer is used in the vat). The wire basket should be sterilized in chlorine solution and placed on a metal stand on the floor so that it does not contact the floor.

The above are merely suggestive of the insanitary practices that may be found in ordinary operations.

7. *Contaminated Wash Water.* In washing curd the water employed must of necessity be potable, free from sediment, and of acceptable bacteriological quality. This implies a low total bacterial count and freedom from coliform organisms and other types capable of growth in cottage cheese with consequent quality deterioration. Water must be piped directly to the cheese vats; hose lines should not be used.

In some cases, especially where a storage tank is in use, wash water becomes contaminated with molds or coliform organisms. If the storage tank is responsible, regular scrubbing followed by rinsing and spraying with chlorine solution will correct the trouble. If the entire supply is contaminated, it should be chlorinated. One means is by using a proportioning pump at the water intake into the plant.

Sometimes, the filter cloth used on the end of the pipe leading into the vat is not replaced frequently enough and thus becomes a source of contamination. The water should always be filtered, unless it is from an exceptionally clean supply and the pipe-lines are shown to be free from rust and scale.

8. *Failure to Sterilize All Equipment and Utensils.* Every piece of equipment involved in the process should be sterilized by a solution of 50 ppm. available chlorine for a contact period of 5 min., or by hot water of at least 170 F. for at least 5 min. Especial care must be taken to sterilize thoroughly all equipment beyond the pasteurizing system, otherwise contamination is sure to result. If hot water is used, an exposure to 170 F. for 5 min. must be obtained throughout and at the outlet of the system.

Cheese vats may be sprayed with a chlorine solution of 200 ppm. just prior to entry of the skim milk. A suitable tank, preferably of stainless steel and so constructed as to be easily cleaned, should be provided for sterilizing utensils in chlorine solution of 50 ppm.

Cans used for curd are best given an additional sterilization with chlorine solution after coming from the can washer. These cans, of course, should be in excellent physical condition. Covers should be thoroughly cleaned and should be on the can during the rinse with chlorine solution. Parchment paper should be used between the cheese and the cover.

■ **"Unfortunately, some consumers have been exposed to yeasty, off-flavored cottage cheese to such an extent that they have come to accept it without audible complaint. But certainly, such a product cannot promote consumption, and it is questionable if people can go from a clean-flavored cheese to an off-flavored product and not note, and speculate on, the lack of uniformity."**

9. *Contamination During Creaming and Mixing.* Recent work has shown that the creaming and mixing operation is apt to be a more significant source of contamination than the curd-making process. Best conditions for maintaining a sanitary operation usually are observed when the creaming, mixing and packing are done in the same plant that makes the curd. There is then only one operation and one supervision to consider in place of divided responsibility where the curd is shipped to another plant to be creamed and packaged.

Any equipment used for mixing and standardizing milk and cream for the creaming operation should be sterilized with chlorine solution. Due to the failure to carry this out, cream has been found highly contaminated with yeasts and molds and coliform organisms. Throughout the handling of the curd and the creamed cheese, care must be taken that parts of utensils contacting the product are not contaminated by the hands.

10. *Faulty Packaging Operations.* The packaging operation may also be a source of contamination if the filling machine is not sterilized. Any utensils used should be sterilized in chlorine solution, and any vat employed for creaming should be sprayed or flooded with chlorine solution. The filler should be sterilized after assembly by running it with a small amount of chlorine solution, and all parts of the filler hopper should be contacted by chlorine solution, preferably by spraying.

Here, also, the habits of the operators should be carefully watched. Sometimes you find a perfect job of equipment sterilizing—only to have certain pieces again contaminated by contact with the hands or with the floor. If a pail contacts the floor and is then used for dipping into the vat, the initial sterilization, of course, did no good whatever. For the purpose of mixing cream and curd in the vat, all-metal shovels of welded stainless steel construction may be used.

Contamination in transferring curd from the mixing vat to the filler hopper must be avoided. For this purpose, a hopper attached to the edge of the mixing vat for conducting the curd into a pail on a metal stand is satisfactory. From the standpoint of sanitation, the best method of transferring the creamed curd from the mixing vat to the filler is by means of a sanitary pump. Such a pump is now being used in routine operations, and it has proved entirely satisfactory, except where the market demands a definite large curd particle size with an absolute minimum of curd breakup.

The above discussion has briefly covered a number of possible sources of contamination of the curd and the finished product. Undoubtedly, other sources may be distinguished as various operations are studied.

The success of efforts made to correct these defects can be judged by determination of the total yeast and mold count and the count of organisms of the coliform group, using the plating method. Individual instances of high yeast counts in cheese of satisfactory quality have been experienced. But these involve inert types of yeast. However, it has been demonstrated that the yeast-and-mold count of the fresh cheese has a general relationship to its potential keeping quality. It has also been demonstrated that total yeast, mold and coliform counts of less than 10 per g. can be achieved in practice.

Plate counts of contaminating organisms should be supplemented by keeping quality tests, consisting of exposure of separate samples of the finished product for one day at room temperature (approximately 70 to 75 F.) and for seven days at 40 to 45 F. The cheese should show a good flavor and aroma after these tests.

IFT Personalities at San Francisco

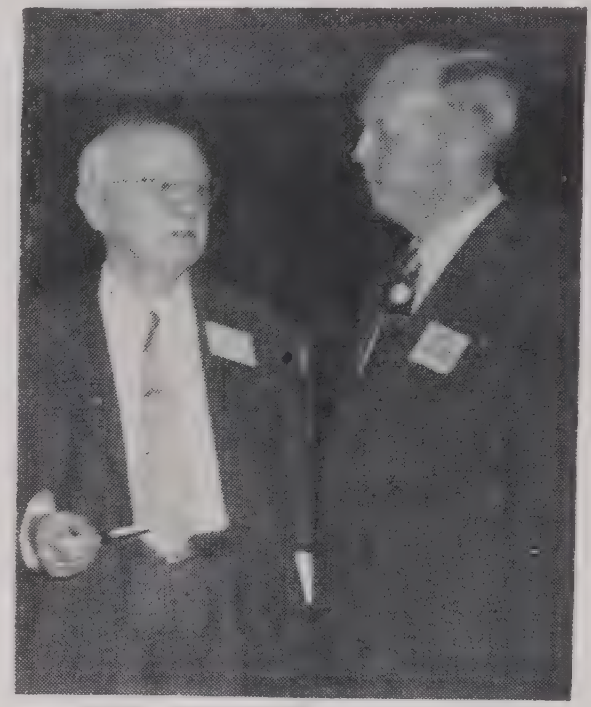
New IFT president, C. R. Fellers (left); retiring president, H. C. Diehl; and new executive secretary, Col. C. S. Lawrence.

E. H. Wiegand (right), chairman of newly chartered Oregon section, and Ernest E. Jacobs, formerly secretary of Northern California section.

Emil M. Mrak (right), chairman of program committee, and Lloyd A. Hall, 1950 program chairman, for meeting in Chicago.

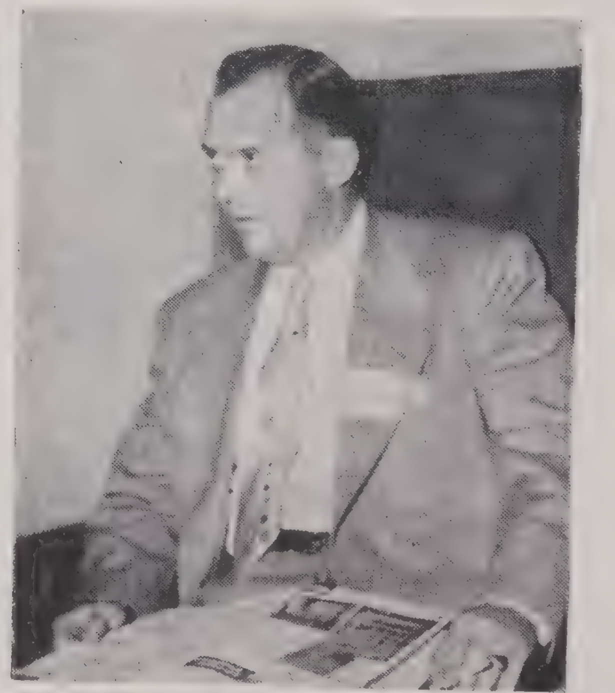
M. E. Parker (right), director of food technology program, Illinois Institute of Technology, and Mr. Kearns of St. Louis.

S. C. Prescott (right), Dean Emeritus of MIT, and former student Philip K. Bates and wife. Mr. Bates is with Rexall Drug Co.



Louis B. Howard (right), head of food technology department, University of Illinois, and E. M. Chace, California technologist.

Technologists at banquet table. Left to right: Col. C. S. Lawrence, new executive secretary; Roy C. Newton, winner of Nicholas Appert Award; H. C. Diehl, retiring president; C. R. Fellers, new president; and S. C. Prescott, past president. Ladies are Mrs. Fellers (left) and Mrs. Diehl.



Norbert H. Volle, chairman of newly chartered Ohio Valley section of IFT. He is chief chemist of Kroger Co., Cincinnati.

Highlights of IFT Convention

Part II

Additional top-interest topics from San Francisco technical sessions. Panel headed by FI Editor discusses Advanced Food Plant Engineering

FI STAFF

Plant Sanitation. Papers presented by the leaders of this discussion group pointed out the rapid advances in plant sanitation and in the advanced engineering of food processing equipment to improve sanitation.

James Brazee, The Creamery Package Mfg. Co., Chicago, observed that the general tendency of most manufacturers is to use stainless metals throughout for their equipment. In design, the principal elements determining sanitation efficiency are: (1) All surfaces of the equipment should be smooth, covers hinged to expose for ready cleaning, all movable parts readily dismounted, designed to assume the proper heat treatment, and all dead pockets eliminated; (2) Ruggedness; (3) Efficiency in operation.

Lewis Shere, president Diversey Corp., Chicago, reported on sanitizers for the food industry. In the past few years, he said, there have been many developments and materials for cleaning food plant equipment. Disinfecting equipment is less complex than cleaning, he observed, and the surfaces of such equipment should be cleaned before disinfecting.

Due to the diversity of residues to be removed and the fact that these surfaces do not have a uniform degree of resistance to cleaning materials, specialized products are needed for cleaning. The development of a so-called ''universal cleaner'' is not in the realm of possibility, he stated.

Frank X. Kern, vice-president, Whitmire Research Laboratories, St. Louis, speaking on ''The Proper Formulation of Insecticides for the Food Industries,'' said it is more important for the insecticide manufacturers to know the possible health hazards of their insecticides in the finished formulation that reaches the public than it is to be able to make extensive claims for insect control.

Most pest control materials, particularly insecticides, have not been developed specifically for the food industries, he pointed out, but rather are designed for farm or home use. Their hazards may prove extremely dangerous in food processing. Many insecticides cannot be removed from food products and some may be toxic.

Advantages of In-Plant Chlorination. Break-point chlorination has given considerable impetus to the use of chlorinated water in food plants and processes, according to William J. Scarlett, Wallace & Tiernan Co.

In shellfish plants, the sanitation problem is particularly troublesome because the shellfish carry a great deal of dirt into a plant. So those fish are put into tanks of heavily chlorinated water for 48 hr. to allow each fish to draw the chlorinated water through its system.

In yeast plants, chlorinated water is employed in air washers to sterilize, to some extent, the air brought into the plants. This helps to overcome troubles resulting from airborne spores and wild yeasts.

In canning and freezing plants, in-plant chlorination is being applied to the entire water supply. Not only does it reduce frequency of plant clean-up due to slime formation, but it improves the product in appearance, flavor and odor.

Many other food industries have adopted in-plant chlorination, including brewing, dairy products, meat and confectionery.

Use of chlorinated water in cleaning equipment is effective because it avoids rapid build-up of the bacterial ''load'' during processing and avoids frequent stoppage of production to clean up. Such production delays involve costly loss of time and sometimes of product, aside from being expensive in terms of labor.

Bacterial reductions ranging from 29 to 99 percent have been attained by in-plant chlorination in canneries processing peas, corn and beans.

Improving Organoleptic Tests. In organoleptic analysis of food products, the studies should be sharply divided into two distinct types of tests, in the opinion of Frances Carlin, Foods & Nutrition Dept., Iowa State College. Both the amount of a quality and the preference for a quality should be determined. Failure to recognize the distinction between these is the cause of much confusion in methodology and in the interpretation of results.

Taste panel members must be selected for their ability to consistently detect the kind and degree of differences which occur in a particular experiment. This can be done by the ''triangle'' test. Each taster is given three samples of the product, two of which are identical. Then the taster must identify the two which are alike. This is repeated seven times and, to qualify, the taster must have five or more correct answers.

When a different product is to be tested, a new panel should be selected. For people who are capable of testing one food, may not be qualified to test another of different characteristics.

Quantitative determination of the flavor and odor of frozen fruits and vegetables was discussed by John B. Wegener, TVA and Tennessee Agricultural & Industrial State College. The method is based upon the quantitative oxidation of volatile reducing substances in the internal atmosphere of frozen fruits and vegetables. This is done with an alkaline solution of potassium permanganate.

It has been shown that the amount of volatile reducing substances in odors of foods increases, and organoleptic properties change, as spoilage sets in.

A new approach to odor evaluation was presented by B. E. Proctor, Department of Food Technology, M.I.T. A combination of physical and organoleptic technics applied in the study of terpeney odors of orange oil, it is believed to be useful in testing many foods and food components.

The technic involves use of calibrated odor panels together with a phys-

CHICAGO
INVI S YOU

ADVANCED Food Plant Engineering in all its phases was discussed in a group session led by F. K. Lawler, editor **Food Industries** (seen here at rostrum). Left table panel members are (l. to r.): Louis B. Howard, Edwin Mitchell, and Bruno Pilorz. Right table members are: W. V. Cruess, William deBack, and J. W. Tapp.

Experts Stress Benefits of Advanced Food Plant Engineering

The accelerated trend toward advanced food plant engineering was emphasized in the group discussion headed by F. K. Lawler, editor of FOOD INDUSTRIES. And the six panel members cogently analyzed the problems and advantages of advanced engineering from the different major viewpoints.

For one thing, it was emphasized that management can build and maintain a successful operation only by keeping abreast of current practices and continuously trying to make improvements—this being the opinion expressed in a paper prepared by J. R. Braden, executive assistant to the president, Richmond-Chase Co., Edwin Mitchell, technologist for the company, presented this paper in Mr. Braden's absence.

In applying advanced engineering, it was stated, the function of management is to make decisions based upon surveys by technologists and engineers. In reference to investments in labor-saving equipment, Mr. Braden remarked that machines do not demand eight paid holidays a year, two weeks' vacation with pay, overtime after 40 hrs., *ad infinitum*.

There is no doubt, Mr. Braden observed, that advanced engineering does improve public relations and personnel morale.

Bruno Pilorz, operations manager, California Packing Co., defined a good food plant as a factory where products of the best possible quality are made at the lowest possible cost. The accomplishment of both these ends is intimately linked with good engineer-

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ical method of determining oxygen absorption and also infrared spectroscopy. These place odor evaluation on an objective and reproducible basis.

A standard Warburg manometric system was used to measure the quantity of oxygen absorbed under controlled conditions. And changes in the infrared absorption spectra of the samples were studied in order to follow the chemical changes during oxidation and suggest possible reaction products. Odor panels gave data on the quantity of oxygen to produce terpeney odors.

In orange oil it was found that carvone and carveol are responsible.

How to conduct a taste panel for evaluation of edible oils was the subject of a paper by Helen Moser, Northern Regional Research Laboratory. A taste panel can detect the odors and flavors much better when the oil is warm than when it is cold, a temperature of 55 deg. C. being recommended for soybean oil.

In tasting oils, four samples are the maximum number that can be tested at one time, because of taster fatigue. To be effective, a taster must be genuinely interested in the work. Taste tests should be conducted in a room where the temperature and humidity are controlled. Smoking was found to be no deterrent to good performance on the part of a taste panel member, a chain smoker and a non-smoker performing with equal accuracy in tasting soybean oil.

New Flavor Profile Technic. An interesting new technic of flavor analysis was described in a paper by S. E. Cairncross and L. B. Sjostrom, Arthur D. Little, Inc. Called the "flavor profile," it indicates degrees of difference between samples on the basis of the intensity of individual flavor notes, the degree of blending and the overall amplitude.

The flavor profile is a sort of flavor spectrum, and may be expressed in either diagrammatic or tabular form. In the latter case, it resembles a system of grading with a semiquantitative indication of the variation of the principal character notes.

However, a profile is diagrammed for easy interpretation. A semi-circle represents the complex flavor body, the area being a measure of amplitude. Radius lines intersecting the semicircle represent individual flavor notes. Those just reaching the semicircle are at threshhold level. Distance beyond the semi-circle indicates detectable intensity (photo page 62).

Ascorbic, Dihydroxymaleic Acids Better Antioxidants Than Citric. The comparative values of ascorbic, citric and dihydroxymaleic acids as antioxidants in frozen pack apricots, peaches, cherries and prunes were discussed by C. C. Strachan. The paper had been prepared by Strachan and A. W. Moyls, Department of Agriculture, Summerland, B. C., Canada.

Investigations have led to the conclusion that ascorbic acid and dihydroxymaleic acid are equally effective antioxidants for frozen fruits. Citric acid did not prevent oxidation, nor did it lessen the amount of ascorbic acid required. Ascorbic acid in amounts of 150 mg. to 200 mg. per lb. of fruit and syrup were effective.

ing and good technology, taking advantage of all the best developments in the food manufacturing field.

Looking to the future, Mr. Pilorz stated that certain individual operations in the food plant can be, and probably will be, done by mechanical means better and more efficiently than they are now being done by hand. And the food technologist's participation in those developments should make his job an exciting one.

W. V. Cruess, Food Technology Div., U. of California, stressed the need for cooperation between the technologist and the engineer in food factories. In this way unforeseen hazards in advanced engineering can be avoided. However, Dr. Cruess stated that there usually are more advantages than hazards in advanced engineering.

The final decision in respect to whether a new and advanced engineering change should be adopted ought to be made by the food technologist, in Dr. Cruess's opinion, chiefly because the technologist is responsible for quality.

Dr. Cruess indicated that changes in the training of the food technologist are desirable in order to meet the requirements of advanced food plant engineering.

William deBack, vice-president, Anderson-Barngrover Div., Food Machinery & Chemicals Corp., mentioned the great strides being made in efficient handling of materials. The individual handling of 50-lb. crates and big boxes, for example, has been superseded by lift-truck handling of 2,000 to 3,000 lb. pallet loads. And pallet loads are handled by automatic dumping or unloading machines.

New processing equipment, Mr. deBack observed, also is reducing labor demand, as well as improving quality. These units include pear peelers, peach pitters, apricot cutters, tomato and vegetable peelers, and improved corn and green bean preparatory machines. Short-time high temperature processes also have reduced costs and improved quality with several products.

The trend to improved handling, processing, and packaging will offset increased labor rates to produce the end product at overall lower production costs. Several continuous freezing methods are now in the process of development.

Plant management, in Mr. deBack's opinion, generally considers most equipment a good investment, since the savings effected by it will return the investment in three years or less.

Jesse W. Tapp, vice-president, Bank of America, discussed the financial and economic aspects of advanced engineering. He said that efficient low cost processing and distribution of food is necessary to maintain maximum domestic consumption. This also is vital in the period ahead, during which the possibilities of the export markets appear to be more and more restricted. We are rapidly approaching a new "pressure of food supply on the population."

In respect to financing equipment, Mr. Tapp said that certain types of easily removable equipment may be financed on a term basis, as are automobiles. Financing of fixed capital improvements must take into account such things as obsolescence, general industry, over-expansion, appropriateness of plant location, management, and so forth. Equity capital for fixed capital requirements is preferable to excessive borrowing.

Highly specialized, single-purpose, processing plants are not often sought as collateral for term loans by banks, said Mr. Tapp, except in those cases where earning capacity and general financial soundness are well proved.

Speaking about business conditions, Mr. Tapp called the present recession a postwar price and inventory adjustment. It represents a constructive solution of the inflation problem, and much of this adjustment is already behind us.

Louis B. Howard, head, Food Technology Dept., U. of Illinois, discussed the education needed to prepare college graduates for a career in the food processing industry. He said that more engineering training is required than in the past.

He also stressed the advisability of cooperation between industry and the colleges and universities in training young men. Students would, he said, profit from a training schedule under which they went to school six months and then worked six months in a food processing plant.

Higher proportions of acid appeared to be of little value.

Citric acid seems to improve the flavor and tartness of low-acid fruits. When used with apricots or peaches, however, the flavor was adversely affected. Retention of ascorbic acid was good after extended storage at -4 deg. F.

Preservation With Gases. After outlining briefly the early experiments in the use of epoxides, Chairman H. J. Phaff, U. of California, Berkeley, called on Dr. Lloyd A. Hall, Griffith Laboratories, Chicago, whose panel paper described experiments to discover the degree of contamination present in spices.

In pepper were found 16,000,000 bacteria and 4,000 to 5,000 mold spores per gram. Since spices are used in the preparation of some meats, particularly sausage, such contamination has materially lessened the life of these products. Research indicated that straight ethylene oxide brought excellent results. In subsequent experiments, it was found that this material was effective in destroying contaminating organisms in flour.

Speaking on the work done in fumigating dried fruits, Frank Baerwald, Rosenberg Bros. Co., San Francisco, said the dried fruit industry was faced with this problem: The only way in which it was possible to preserve dried fruits at all was to keep the moisture content down—between 20 and 22 percent. This, however, resulted in a tough and not-so-palatable fruit which required cooking before eating. Fruits with a 30 percent moisture content were much more desirable—also more perishable.

There was also the problem of keeping dried fruits sterile after they had been fumigated. The solution for all this was to package these products in cellulose bags and then sterilize with ethylene gas.

Mr. E. Smith, Valley Date Growers, observed that it was originally thought water must not come in contact with dates, even for cleaning purposes, since a 22 percent moisture content is the point where molds begin to form. Some packing plants even went so far as to prohibit the use of water in washing floors.

But four years ago, he said, it was discovered that excess moisture was not disastrous if ethylene gas were used for sterilization. Now dates are actually washed before packing and the gas has eliminated the use of expensive drying equipment.

Speaking on the fumigation of fresh products, Dr. Dean E. Pryor, Wallace & Tiernan Sales Corp., said, "We faced several problems before we discovered the most effective means of fumigating fresh products. We needed a gas that would kill the organisms but leave the host alive. It could leave no toxic residue, and yet it should thoroughly penetrate the product. It had to be non-toxic, and non-irritating to humans, non-explosive, and be cheap enough to apply to carloads of vegetables.

Several gases were found effective with different kinds of products, such as carbon dioxide for vegetables and sulphur dioxide for grapes. Ozone was tried unsatisfactorily with citrus. Nitrogen trichloride has shown excellent results for blue or green mold on oranges—it is also effective on onions, peppers, and cantaloupes.

Dr. B. S. Luh, U. of California, Berkeley, described the use of epoxides with fresh fruits. He pointed out that before using this material, 80 percent of the market strawberries spoiled within 24 hr. The use of epoxides has increased their life up to 72 hr. without spoilage.

"There are certain dangers connected with the use of ethylene and propylene gases," warned Mr. Bernard of Carbide & Carbon Chemicals Corp. "There is some chance of explosion, and without proper ventilation, it can be irritating to the eyes. The epoxides have a very high apparent ignition temperature, and users must realize this and guard against it. However," he said, "there have been no recorded cases of death or serious accident from their use."

Brewers' Yeast. Dr. Samuel Lepkovsky, U. of California, led off this discussion by emphasizing the use of brewers' yeast (inactive dried yeast) in poultry and animal feeding. He pointed out that this yeast contains the entire B complex, and also unknown vitamins not contained in other feeds, as well as riboflavin, proteins and minerals.

He said it was particularly valuable in supplementing "high fiber" feeds, such as corn, and was a safety factor for their use. The question of whether yeast might be able to bridge the gap between animal and vegetable protein was raised and the wartime shift from animal protein to soybean products was cited.

Discussion turned to the difference in the nutritional value of brewers' yeast as compared to "primary grown" live (bakers') yeast. Live yeast had a tendency to attract vitamins and use them up while brewers' yeast did not.

Panel Chairman Elsie Singruen, secretary, Brewers' Yeast Council, Chicago, revealed that certain strains of brewers' yeast had been found to contain B-12, the animal protein factor, in free as well as bound form.

Dr. C. H. Keipper, Red Star Yeast Co., Milwaukee, noted the use of a special brewers' yeast in breadmaking. But despite its great nutritional value, it has not gained general acceptance by bakers, he said. It changes the color, odor and texture of the bread to a slight degree.

Several points were developed by Miss Singruen, who noted the new yeast's particular value in bread for institutional feeding and for the aged. She said a 3 percent yeast ingredient in bread has been shown to increase biological protein as much as 33 percent and has been rather widely used, post-war, in Germany to combat edema, also in crackers served to children in London.

Freezing Eggs in the Shell. S. A. Kaloyereas, Louisiana State University, Baton Rouge, La., reported that shell eggs may be frozen without breaking of the shells if: (1) The egg is partially dehydrated to remove from 1 to 1.5g. water from each egg; (2) the decrease in volume of egg white is sufficient to permit expansion of the yolk as it freezes; and (3) the freezing is done under vacuum.

The dehydrant used was phosphorus pentoxide—placed with the eggs in a compartment under vacuum, but not in immediate contact with them.

The treated eggs showed a 43 percent decrease in "bound water" and a 44 percent increase in "free water" content, a lowered freezing point for the whites, a higher freezing point for the yolks, and an improved stability in the physio-chemical properties of the egg meats at low temperatures with the result that the embryos survive a low storage temperature. Eggs stored at 24 deg. F. for six months had a 10 percent survival of embryos when incubated.

Rapid freezing by use of solid CO_2 prevents hardening of yolks. Freezing reduces further loss in egg weight during storage, as well as inhibiting biologic deterioration. Frozen eggs regain original water content when thawed in water under vacuum but deteriorate rapidly after thawing. Reconstitution before using is not necessary.

Oil Treatment of Shell Eggs. J. R. Vickery, Commonwealth Scientific & Industrial Research Organization, Hornebush, New Wales, Australia, in a paper read by Mr. Bell, reported inconsistent results from oiling of shell eggs. He thinks these inconsistencies relate to the elapsed time between the laying and the treating of the eggs. As many as 3 days sometimes elapse, but only 3 hr. in other cases. Oiling results in a lower pH in egg meats during storage, whereas eggs not oiled develop an increased pH.

Quality of the treated eggs, when cooked after a storage period, is better than that of untreated eggs. But the pressure of bacterial rot in oiled eggs is not as easily detected by candling as in the untreated eggs.

Delay Plus Bruising Gives Off-Flavor. Dr. Rachel Uhvits reported on findings of the Western Regional Research Laboratory, Albany, Calif., as to the role of bruising in the development of "delay" off-flavor in frozen peas.

Viner shelled peas develop a strong off-flavor, and there is a toughening of the skin. Both toughening and off-flavor increase at high temperatures, while chilling slows down these reactions. Tender young peas acquire off flavor more quickly. Aldehydes increased in bruised peas.

When unbruised peas were held 24 hr. at room temperature, no change in flavor and color resulted, but texture changed.

Bruising alone does not produce off-flavor. Neither does delay alone. But bruising and delay together impair flavor and also cause texture and color deterioration.

Coffee, Black
Coffee + Sugar

FLAVOR PROFILES charted on the blackboard. These two show that sugar gives black coffee more flavor body, as indicated by size of semicircle. Radius lines are individual flavor notes.

Highlights of other papers will appear in Part III, October Food Industries.
—*The Editors.*

READY FOR ACTION, the Gaertner refractometer (left) is here hooked up to temperature control equipment.

Corn Maturity Test Shaped to Your Cannery Routine

Studies show how to proceed, also how to interpret plant variations that affect refractometer results, even where only a single operator is involved

LEONARD BERTH and K. G. WECKEL
Division of Food Industry, University of Wisconsin

Investigations concerning the proper use of the refractometer for determining the maturity of corn, and the related grading of corn for canning, brought practical results during the 1948 season.

These studies were projected to—

- Uncover conditions affecting the interpretation of results of this analytical procedure.
- Standardize the method, and
- Adapt the procedure to commercial operating conditions.

Made during commercial corn canning operations, the studies were carried out over a period of five weeks. The procedure used by Scott was employed, though modified somewhat during the course of the study.

It was found that selection of the sample, method of cutting the kernels from the cob, handling of the cut sample, and variety of corn and samples within the same variety, all caused deviations in the final analysis so as to affect the operational procedure in the handling of the corn itself.

The resulting procedure embraced and compensated for a number of factors known to cause deviations in results. When used by the quality control laboratory, field department, and in-plant processing, it resulted in good coordination in harvesting and processing. Its use made possible the packing of corn of uniform quality during the entire season.

It was also determined that use of the instrument by a single operator was entirely feasible.

Sampling of Field Corn

The refractometer technic yields relatively precise results. Consequently, in the appraisal of the quality of a stand of corn, the first concern must be to obtain truly representative samples. Moreover, samples must be handled so as to retain the qualities unchanged until delivery to the laboratory. The following suggestions are offered for the proper care of corn picked for the laboratory:

1. Remove ear from stalk with all outer leaves left intact.
2. Take samples only from an area in the field that can be harvested in one working day.
3. Wrap samples in newspaper, tie with cord, and label properly. Label should include (a) grower's name, (b) variety of corn, (c) field from which picked, and acres available, and (d) time picked and date.
4. Place wrapped sample in coolest portion of automobile. This is generally the rear floor. And incidentally, an iced cabinet would appear to be helpful.
5. Samples should be delivered to the laboratory as soon as possible.

When the silk on the sweet corn ear in the field begins to turn a deep yellow, the kernels are starting to form. The kernels at this point contain approximately 82-83 percent moisture. Five days to a week later, the moisture will decrease to about 80 percent, and from here on it is a rule of thumb that the corn moisture, in the kernels, will decrease 1 percent per day.

Changing Composition of Sweet Corn

Variables, such as mean temperature, humidity, wind, cloud cover, soil condition, soil fertility, soil level and

CONVERSION SCALE Gives Check On Golden Sweet Corn

Percent Moisture	Gaertner Refractometer at 25 Deg. C. (77 F.)
82	2°—35′—2°—49′
81	2°—50″—3°—06′
80	3°—07′—3°—22′
79	3°—23′—3°—38′
78	3°—39′—3°—54′
77	3°—55′—4°—10′
76	4°—11′—4°—26′
75	4°—27′—4°—43′
74	4°—44′—4°—59′
73	5°—00′—5°—15′
72	5°—16′—5°—31′
71	5°—32′—5°—48′
70	5°—49′—6°—04′
69	6°—05′—6°—20′
68	6°—21′—6°—36′
67	6°—37′—6°—52′
66	6°—53′—7°—09′
65	7°—10′—7°—25′
64	7°—26′—7°—42′
63	7°—43′—7°—58′
62	7°—59′—8°—14′

drainage, variety of corn, and probably others, affect the rate of change of composition of the kernel.

Fig. 1 shows the changing composition of sweet corn after moisture reaches 80 percent—from the very early milk stage to when the corn has darkened in color and has started to form into permanent dent. The composition is calculated on the moisture-free basis, assuming the moisture lost per day is 1 percent. It is noted that the ash, fiber, protein and total carbohydrate remain relatively static during this period. The sugar-starch level changes radically. It is within this period, too, that the sugar formed through photosynthesis is condensed to starch in the endosperm.

In Fig. 2, this same changing composition is given on a true-value basis. It can be seen the protein, fat and ash increase little during this period, whereas the total carbohydrate increases steadily. From consideration of the data in Figs. 1 and 2, the sweet corn canner's problem—to harvest the corn at exactly the proper time—can be better understood.

If it is picked too young, say 76-78 percent moisture, the yield from the field will be low and there will be a high tare weight of useless corn. This same corn will tend to turn gray in the can when processed. It will yield a low value in cases per ton because the percent cut off will be low and, further, much of the corn moisture will be lost in cutting and handling. Such corn when canned is objectionable to the consumer because of its shrunken appearance in the can.

If corn is picked late, when the moisture level is at 68-69 percent, the field yield and the in-plant yield will be greater. However, as whole kernel style corn, the product usually possesses a chewy, tasteless quality. The maximum period the canner has to pick corn for a quality pack will be considerably less than ten days.

The relationship between the refractive index of corn juice and moisture content of the corn, is not constant for different varieties of corn. Consequently, it is necessary to prepare a conversion chart for these factors for each variety of corn. A conversion table for the variety of Golden Cross is presented (on this page), using Abbe-Gaertner refractometer described, and the Brown-Duvel procedure for determination of corn moisture. In the absence of actual corn moisture determination, it can be sufficiently approximated from such a conversion chart to determine a gage of standing corn quality, and its suitability for canning.

It is suggested that approximately two dozen ears be brought to the la oratory from a test plot and the r fractive index determined. When th estimated corn moisture declines to level of 76 percent, corn from the sam ears should be separately cut, canne and processed under the canning conditions desired. This should be don until the corn moisture, as estimate from the refractometer readings, reaches a level of 69 percent.

Forecasting Harvesting Data

A moisture content of 72 percent has been found to be optimum. When moisture of corn in the field is known to be approximately 80 percent, as determined by refractometer, samples should be examined daily in order to approximate the rate of change. It must be remembered, however, that precipitation or an increase in the mean daily temperature will cause the change in corn moisture to deviate from a seemingly established rate. Additional laboratory checks should be made in this event.

It has been noted by other workers that samples of corn picked after a rain will have a considerably higher moisture content than prior to the rainfall. Climatic changes of this nature may alter the refractometer-moisture relationship.

Analysis of Harvested Corn

Every load of corn entering the plant should be analyzed for moisture content. Only in this way can absolute control over the entire season's pack be obtained. The problems of analysis for load corn are the complexity in obtaining a representative sample, reproducibility of results, and time consumption.

It was observed that, when sampling of harvest corn was left to the discretion of an uninstructed platform foreman, "representative" samples, which would enable a true appraisal of the loads, were not obtained. Moisture of the samples ranged from 70 to 77 percent.

In contrast, selective sampling of six ears of corn resulted in a determination of moisture as 73.5 percent, while a larger non-selective sampling of 30 ears brought a reading of 72 percent. The following procedure is considered to be adequate in the selection of a representative sample:

The corn pile is quartered and approximately six ears are picked at random from the periphery of each quarter, as well as six ears from the top of the pile. The corn should be placed in a bushel basket, properly labeled, and taken immediately to the quality control laboratory. Here, all the ears are husked and all the kernels from the usable ears are cut off and thoroughly mixed. About a pound

Six Steps for Determining Moisture Content of Corn

Procedure Using Gaertner Refractometer

1. **Obtain representative samples of corn from load or field.**
2. **Remove husks. Select only those ears which are suitable, and cut off all usable kernels with a mechanical cutter, or manually with a knife, simulating commercial cutter depth of cut.**
3. **Mix kernels thoroughly. Take a small portion and grind through food chopper, discarding this portion. Grind remainder of kernels, being sure that all moisture has drained and has been incorporated to paste.**
4. **Form a pad approximately 2-in. square by ¼-in. thick of absorbent cotton and incorporate corn paste into pad. Fold pad with paste toward inside.**
5. **Express corn juice through cotton pad, between prism faces, by squeezing pad with fingers. Work juice between prism faces by turning prism clamp screw slightly back and forth.**
6. **Allow 1 min. before taking readings. Check temperature of thermostat (77 deg. F., 25 deg. C.).**

FIG. 1.—CHANGE IN COMPOSITION OF SWEET CORN

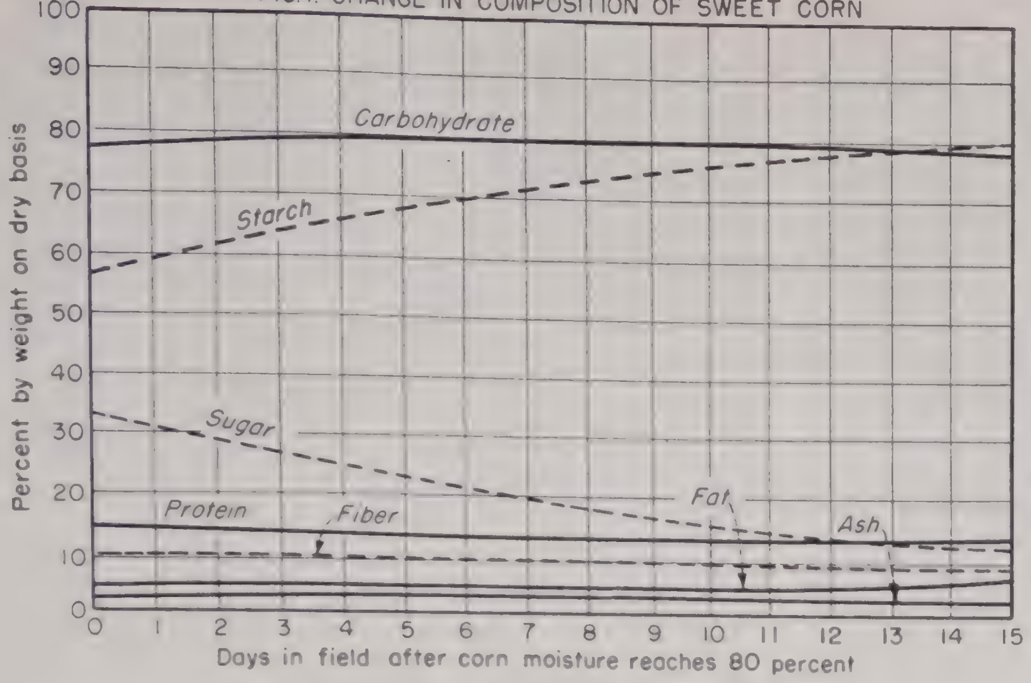


FIG. 3—CHANGE IN REFRACTOMETER READINGS WITH TIME IN PRISMS

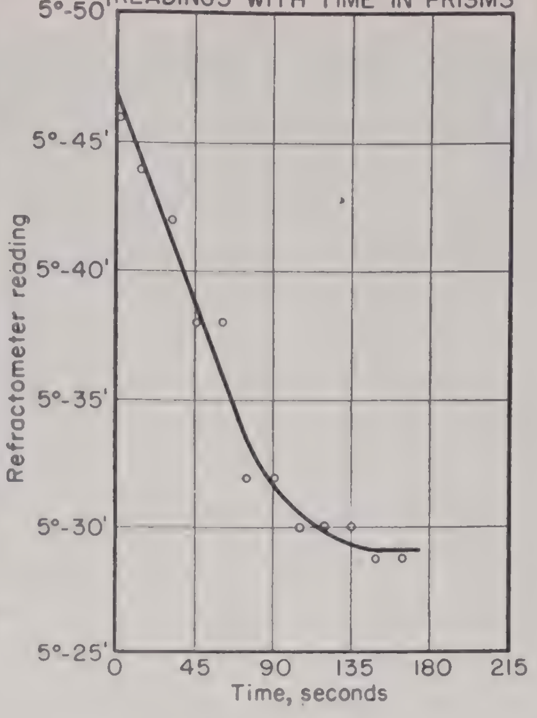


FIG. 2—CHANGE IN COMPOSITION OF SWEET CORN

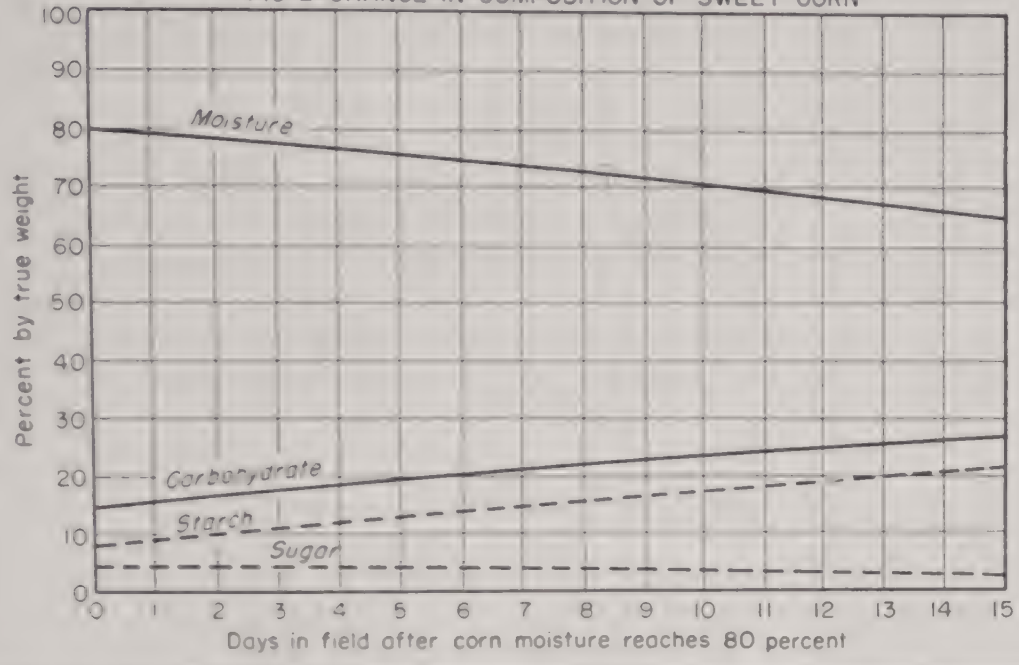
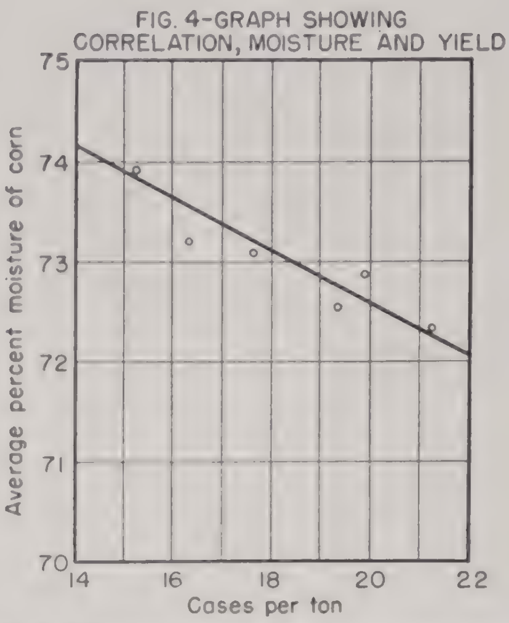


FIG. 4—GRAPH SHOWING CORRELATION, MOISTURE AND YIELD



portion of this is ground for analysis, the rest being returned to the cut corn belt in the plant.

Procedure With Components of Ear

1. **Tip and butt:** A study was made to determine whether the moisture varied throughout the ear of corn. Individual ears were cut in half, separating the tip from the butt end, and all the kernels were removed. The depth of cut was uniform in all cases. All samples were from a single variety. In all cases, the tip-end moisture was less than the butt-end moisture. These results emphasize the need for cutting all the corn from the ear for analysis.

2. **Depth of cut:** The distribution of moisture in the kernel of corn was determined with six ears from which the kernels were cut on one side to the depth of the cob and on the other to include only endosperm. The two types of cut were kept separately and analyzed. In all cases, the moisture was greater in the shallow cut than in the deep cut samples.

3. **Retention of moisture in comminuted sample:** It was noticed that in grinding the kernels in the food chopper, a pool of liquid was left in the base of the chopper bowl. This moisture had always been incorporated with the paste for all analyses. A few tests were made of the paste alone, and then duplicate tests made when the liquid had been incorporated. In all cases, there seemed to be little difference whether the liquid had been incorporated in the paste or the paste alone used. It is considered advisable to incorporate the loose moisture in the sample

4. **Variety differences:** Different varieties of corn having the same moisture content, as determined by the refractometer procedure, necessarily do not yield similar products upon processing. It appears the same refractometer reading on different varieties does not necessarily mean the moisture content is the same. This emphasizes the necessity for changing the standard for moisture for different varieties if a consistent product is to be obtained—e.g., for a "Fancy" pack whole kernel corn of variety "A", moisture of 72 percent may be required, whereas for variety "B", 73 percent may be more desirable.

5. **Pericarp:** During a season of operation, there were a few cases where the moisture content of a variety of a load of corn was acceptable, but the product was unsatisfactory because of a tough pericarp. Identification of these qualities can be readily made in the laboratory and the disposal of the corn properly channeled.

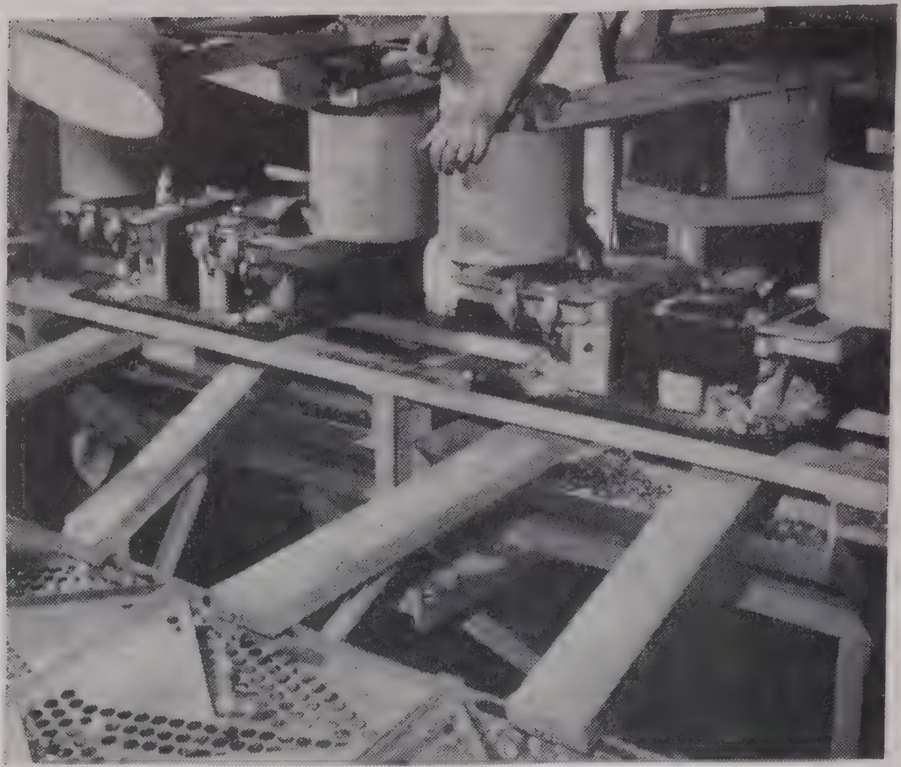
6. **Variations in composition:** Hillside corn is very apt to be irregular in composition and quality. The moisture, as determined by representative sampling technics may permit it to be classified in a certain type of pack. Nevertheless, some ears may be too mature. Such corn must be detected on the trimming belt. Mature ears are easily identified by their deeper color. It is not possible for laboratory technics to avoid the inclusion of such corn in the run.

7. **Time corn juice is in prisms:** Fig. 3 comprises a graph of refractometer readings plotted against time the corn juice is in the refractometer prisms. A series of eight tests of the refractive index of the same sample of corn were made and the results averaged.

(Turn to page 184)

This basic processing of tasty product

1 **NUTS** come from husker, where revolving rasp removed outer shells. Woman shows unhusked nuts.



2 **CRACKING** unit (top) breaks dried husked nuts into halves, then separator (foreground) frees kernels.

3 **BROKEN SHELLS** to which meats still adhere proceed along conveyor belts to be picked by hand.

Bright Future Seen for Hawaiian Macadamia Nuts

Ambitious plans envision scientific mass output and widened distribution of delicacy—with luxury tag discarded in favor of popular prices

ADAM A. SMYSER

Honolulu, T. H.
(With photos taken at Hawaiian Macadamia Nut Co., Honolulu)

With plans on foot for launching mass-production operations featuring streamlined technics, commercial importance is now looming for Hawaii's macadamia nuts.

Reason these round, tasty delicacies haven't hit the "big league" as yet is primarily considered to be the smallness of the operation over the 40 years since their introduction from Australia. Output in 1948 totaled only 100,000 lb. And plantings in 1949 were but 1,164 acres—the kind of performance which tends to keep a product in the luxury class.

Even so, the acceptance of these sweet nuts, at current prices approximating $3 per lb., indicates a broad potential for a much more popular and profitable venture. Distribution has already been gained through numerous U. S. mainland specialty stores as well as in Hawaii itself.

The move to take off the luxury tag is being put underway by one of the Islands' oldest and biggest business firms, Castle & Cooke, Ltd. This company believes that the hard-shelled macadamias have a big future—if the industry is put on the mass production basis. And C&C is prepared to spend $1,000,000 to back up its belief in that future.

Develop Higher-Yield Varieties

First step in the company's long range project is bulldozing 1,000 acres of virgin tropical forest to clear it for orchard land. Only a few hundred of the scheduled 70,000 trees are planted yet, since there is a shortage of desirable varieties. Five varieties that produce three to six times present yields have been newly selected by University of Hawaii scientists.

But plantings will have to extend

will be amplified into major operation

4 **KERNELS** are washed and quality graded by specific gravity. Good ones float. Bad ones sink.

5 **QUALITY NUTS** go to stack dryers, where moisture absorbed in wash is reduced to 1.5 percent.

6 **COOKING** in coconut oil gives nuts glossy, golden-brown color.

7 **AFTER** centrifuge (lower left) rids them of excess oil, nuts get special oil and salt. Then (right) they go in jars, are weighed, and vacuum sealed.

over three years to get enough of the scarce new types. And it will be 1954 before trees planted this year start bearing, 1957 before they are bearing plentifully, and 1961 or later before they reach full production.

From Seeds to Trees

The company anticipates getting a yearly yield of about 500 tons of processed nuts by that time, but it all will depend on how thickly the trees can be planted and how well the new varieties turn out. A mature tree is expected to produce about 130 lb. of unshelled nuts a year, yielding 40 to 50 lb. of shelled nuts.

Today, the two main processing concerns are operated by Hawaii Macadamia Nut Co. and the Honokaa Sugar Co. The following paragraphs describe the operations:

The seed nuts are planted in nurseries in the spring. When one year old, the seedling is grafted with a scion from a selected variety. At two years, the young trees are ready for planting in the orchards. In some localities, windbreaks must be planted, too, for the trees blow down easily.

Macadamia trees are comparatively free from disease and insects. Though they require a frost-free location, they are tolerant to a wide range of rainfall, soil and elevation conditions. This enables use of land that is not adaptable to other crops, such as sugar and pineapple. And the relatively small bulk of the macadamia harvests makes these trees ideal for planting on land where transportation costs for other crops would be prohibitive.

Only a relatively small labor force—two to three employees for each 100 acres—is required to plant, spray, graft, fertilize, and keep the orchards clean.

Land costs and time are the two largest economic factors in the new venture. An economic study (Ar. 248) by the University of Hawaii Agricultural Extension Service estimates that the trees reach a "break even" point in nut production at their eighth year and that the cost of bringing an orchard to this stage is $680 per acre. This does not include land cost, estimated at $150 per acre.

The study concludes, however, that macadamias can be sold in mainland United States at prices comparable to almonds and filberts. Only high-yield orchards will be able to compete with walnuts and pecans.

Picked Up, Not Off

The nuts borne by a single tree mature over a period of several months and are harvested when they fall. Nuts are not picked off trees because it is impossible to distinguish ripe from unripe by color, and the likelihood of hitting on some other suitable means is questioned. During the peak of the drop, nuts are preferably gathered from two to three times a week to avoid loss from rats or molding.

How They Are Husked and Dried

The mature nut is encased in a fibrous green husk which ranges in thickness from ⅛ to ¼ in. Removal of this husk must be prompt, otherwise deterioration starts. When unhusked nuts are piled together in bags, interior temperatures may rise as much as 18 deg. F. in 10 hours. Such conditions are conducive to the development of molds and other organisms that might affect the flavor of the kernel.

Both of the two main processing companies use special macadamia husking machines. The freshly gathered nuts are emptied into a hopper and conveyed to a revolving rasp. This forces the unhusked nuts against a plate held at tension by coil springs. Nuts and husks are automatically separated by air stream as they drop from the husking unit.

Artificial Drying Best

The unshelled nuts must now be dried to reduce kernel moisture, from as much as 25 percent to an optimum 3.5 percent. Drying shrinks the kernel to about $\frac{1}{32}$-in. shell clearance—an advantage in cracking—and also improves texture and flavor.

Several drying methods have been employed—air, sun, and artificial. The first two named are feasible, except in times of adverse weather conditions. But it is the artificial method that saves time, gives a uniform product, and enables regular factory operation. A commercial scale drier has been developed with a vertical-column drying chamber. One used by Hawaiian Macadamia has a drying compartment 4 ft. square by 6 ft. tall, and this holds 2 tons of unshelled nuts. Drying takes four days or longer. A constant temperature of about 100 deg. F. is used.

Care in Cracking

Development of a way to crack the macadamia's hard shell without damaging the tender, brittle kernels posed a problem. Shells are $\frac{1}{16}$ to ¼ in. thick, with thick ones predominating, and they don't fracture easily. But with the cracker now in use, efficiencies up to 96 percent (whole kernels free from the shell) are obtained.

A modified centrifugal machine loosens the kernels within the shells and a sizing machine sorts the nuts and feeds the various sizes to their respective crackers. The cracker holds the nut between two blunt, movable wedges, and the shell is broken into clean halves. An automatic separator shakes out the loosened kernels. Those kernels which adhere to the shell are sent along conveyor belts to be separated by hand.

After shelling, the nuts are washed and at the same time quality graded by the specific gravity principle. The method is based upon University of Hawaii findings that plump, smooth, light-colored, mild-flavored kernels have high oil content and low specific gravity—that is, oil content varies directly as the quality.

Floaters Okay

Air-dry kernels are first immersed in tap water at room temperature and stirred vigorously to free them of air bubbles. Those that float are Grade 1. These are skimmed off and dried by draining and centrifuging. Kernels that sink are drained, then immersed in a light brine (5½ oz. salt to 1 gal. water). Those that float are Grade 2, suitable for confectionery and baking trades. They too, are skimmed off and dried. All kernels that sink in the salt solution are classified as Grade 3 and discarded.

During grading, kernels re-absorb up to 8 or 10 percent moisture. This must be reduced to about 1.5 percent before cooking, because nuts of higher moisture content do not acquire a crisp texture and tend to become rancid. An automatically controlled tray dehydrator, started at a temperature of 110 deg. F., later raised to 170 deg. F., lowers kernel moisture to the proper level in about 8 hours.

Cooking Gets Nod Over Roasting

Nuts can be either oven roasted or oil cooked, but oil cooking is favored since it gives a uniform, glossy, golden-brown product.

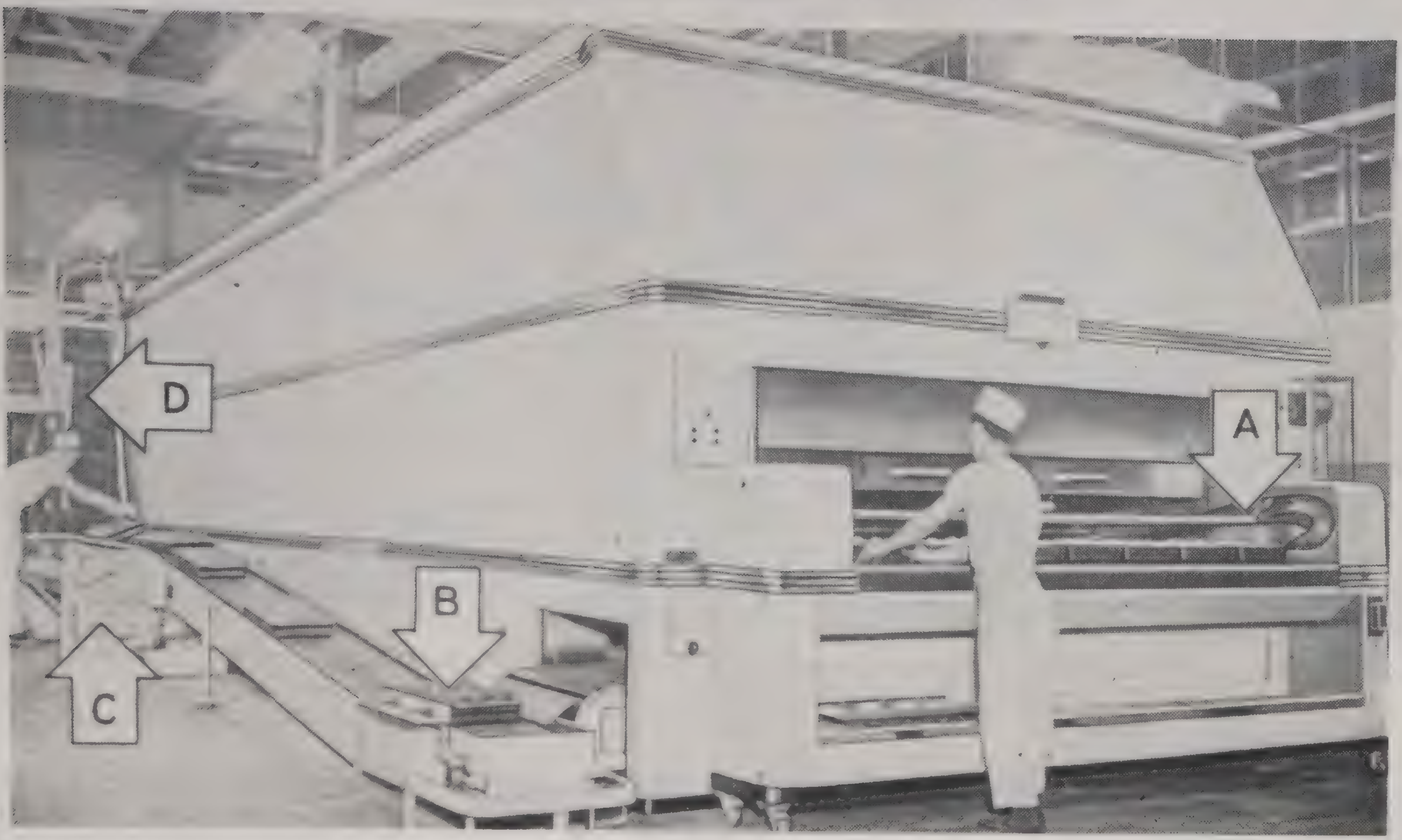
A refined coconut oil is used—about 13 gal. of oil for 1,000 lb. of kernels. Vats and baskets of Monel metal, glass, or stainless steel are preferable. Optimum cooking calls for a temperature of 275 deg. F. for 12 to 15 minutes. The process is complete when kernels have reached the proper shade.

After cooking, the nuts are drained, then centrifuged to remove excess oil. The product is now spread on wire mesh trays, and air is forced through to effect rapid cooling.

When kernels are lukewarm or cool, they are sprayed with a special oil, salted immediately, and are finally vacuum packed. Thus treated, macadamia nuts keep for several years without deterioration.

CLEARING virgin tropical forest for new C&C macadamia orchard. Plantings will take three years, because the new multi-yield trees are scarce.

A SPECIAL FOOD INDUSTRIES REPORT



The Petersen Oven Co.

TRAY OVEN loads and unloads pan bread. Rod (A) pushes row of pans into oven. Baked bread (B) is coming from oven onto conveyor that takes it to dumping station, where operator is seen emptying bread into turnover chute (C). He stacks empty pans on truck. Conveyor (D) takes bread to cooler.

BAKERY PROGRESS

Sparking the forward trends in the field are continuous coolers; panners, depanners, and pan coatings; and oven loaders. Moreover, notable advances have been made in materials handling, sanitation, scaling, and fermentation

CHARLES MISCH

Bakery Consultant, New York City

How far the bakery industry has advanced in the last few years is amply reflected by its recent achievements—in design and manufacture of machinery and equipment, and in the progressive trend of technics "to do the job better."

True enough, most bakeries still operate push-racks, instead of pushbuttons. Nevertheless, the day of the pushbutton bakery can be something more than a dream. For the enterprising, foresighted bakers who yesterday merely noted the new efficiencies afforded by "this automatic apparatus" and "that continuous unit"—are today beginning to adopt them.

The trend is given impetus by the incentive to make a quality product profitably, and with the improved sanitation which is such a strong motivating influence in this industry.

Let us first consider the big contributions made by new developments in the important materials handling phases of the operations:

Flour is the largest volume ingredient received at the bakery. And at present, the 100 lb. sack is still the predominant package to be handled.

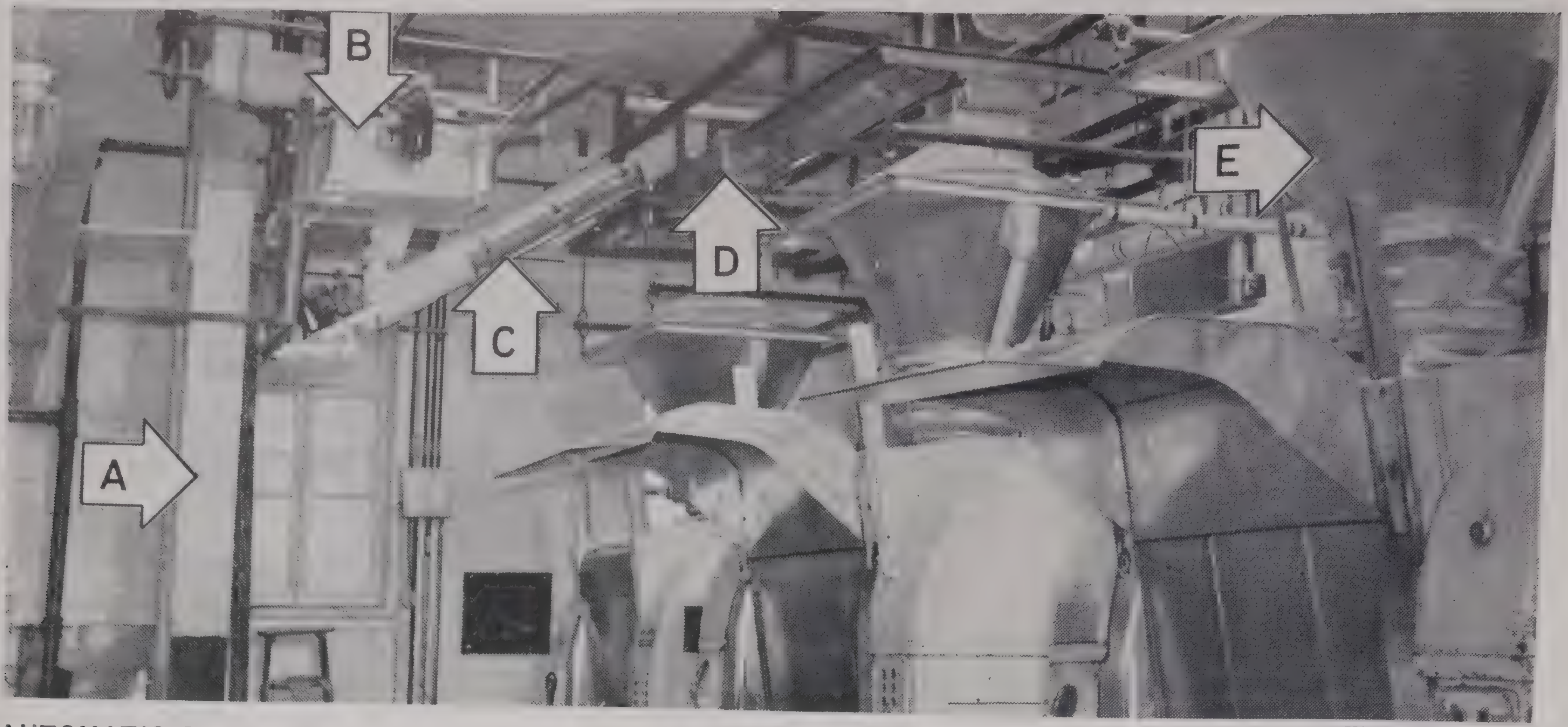
Bakeries with railroad sidings to receive flour in carload lots have found it possible to reduce unloading time by using portable conveyors—power-driven or gravity-roller type. These conveyors are rolled to the door of the car and additional sections of conveyors are placed inside the car as unloading progresses.

Stacked on skids—of wire mesh, pressed steel, or aluminum alloy—the loads are transported to storage. It has been found that maintenance on metal skids is less than on wooden skids. And with the metal ones there is no more flour-bag damage due to nails and splinters. Furthermore, metal equipment avoids the cracks and crevices where flour dust can accumulate, with resultant infestation. The new skids are readily washed and sterilized.

Floor space is conserved and storage capacity increased by palletizing and by using fork-lift trucks to stack pallet loads two or three high.

A modification of palletizing is the use of a collapsible pipe framework, set up around the first tier for the purpose of supporting the second load. To utilize the so-called "air rights" in a high ceiling storeroom, a fork-lift truck, or other type of lift, is necessary. In storerooms with low headroom, the storage battery-powered hand truck lightens the work, thus

Advanced Flour-Handling Systems Save Work, Raise Efficiency



Hinkle Machinery Co.

AUTOMATIC flour handling. Bucket elevator (A) takes flour to roto-sifter (B), then screw conveyor (C) carries sifted flour to twin distributing and return conveyor (D). Next, flour is automatically weighed in hopper (E) and dropped through dust-tight collar into high-speed, water-jacketed mixers, where sponges and doughs are prepared.

improving upon the usual hand-lift truck.

A number of special-purpose hand trucks have been developed to handle drums and barrels. Attachments will adapt fork trucks for the job of stacking drums one on top of another or of laying them horizontally on multiple-tier racks.

Progress in Bulk Handling

Trend toward bulk deliveries of major ingredients is making considerable progress. Tank car or tank wagon deliveries of liquid sugar are no longer considered as innovations. But similar methods of handling liquid shortening, whole milk or condensed milk are still in the experimental stage.

Bulk handling of granulated sugar has been standard practice in a number of candy and chocolate plants, but as yet this system has only been adopted by a few bakeries. Sugar is delivered in hopper-bottom cars and unloaded directly into storage bins. Local deliveries are made in modified coal trucks with specially designed "coal" chutes.

As for flour, bulk handling is definitely "on the way." Although transporting flour from mill to bakery in carloads is still in the trial stage, various pneumatic handling systems are in use for delivering flour from loading dock to storage place. Because of the size and cost of these pneumatic systems, they are not yet practical for medium size or small bakeries.

Semi-bulk handling of flour, though not new, has recently been widely publicized because it can now be installed with economical feasibility. This system utilizes a large aluminum container. Loaded at the mill with approximately 3,500 lb. of flour, it is delivered sealed to the bakery.

Advantages claimed for this method are: (1) Elimination of bags, (2) ease of unloading cars, (3) increase in storage (lb. per cu. ft. of space), (4) reduction in the amount of flour required to be held in storage, (5) avoidance of seepage and breakage, and (6) use of less flour-handling equipment.

Biggest advantage, however, is this method's sanitary aspect. Clean flour, loaded into clean containers at the mill, cannot become contaminated in transit or during storage in the bakery. Empty containers that are returned to the mill, can be washed and sterilized with live steam. Thus, the old bags are out, along with their laundering and the hazards of possible contamination at the mill.

With the new containers, government inspection at the mill alone will suffice—in place of multiple inspections of flour held in storage at several bakeries.

Questions yet to be answered on the use of this method are: (1) What is the maximum distance between mill and bakery beyond which the cost of returning empties will make the operation uneconomical? (2) Can a satisfactory product be produced from the freshly milled flour received in these semi-bulk containers?

A determination of the freight rates applicable to the return of empties, will furnish a partial answer to the first question. These figures must be weighed in the light of tangible advantages gained — particularly improved sanitation.

The second question will soon be answered by the results obtained from full-scale installations in commercial bakeries. These results must be supplemented by laboratory experimentation and scientific selection of wheat.

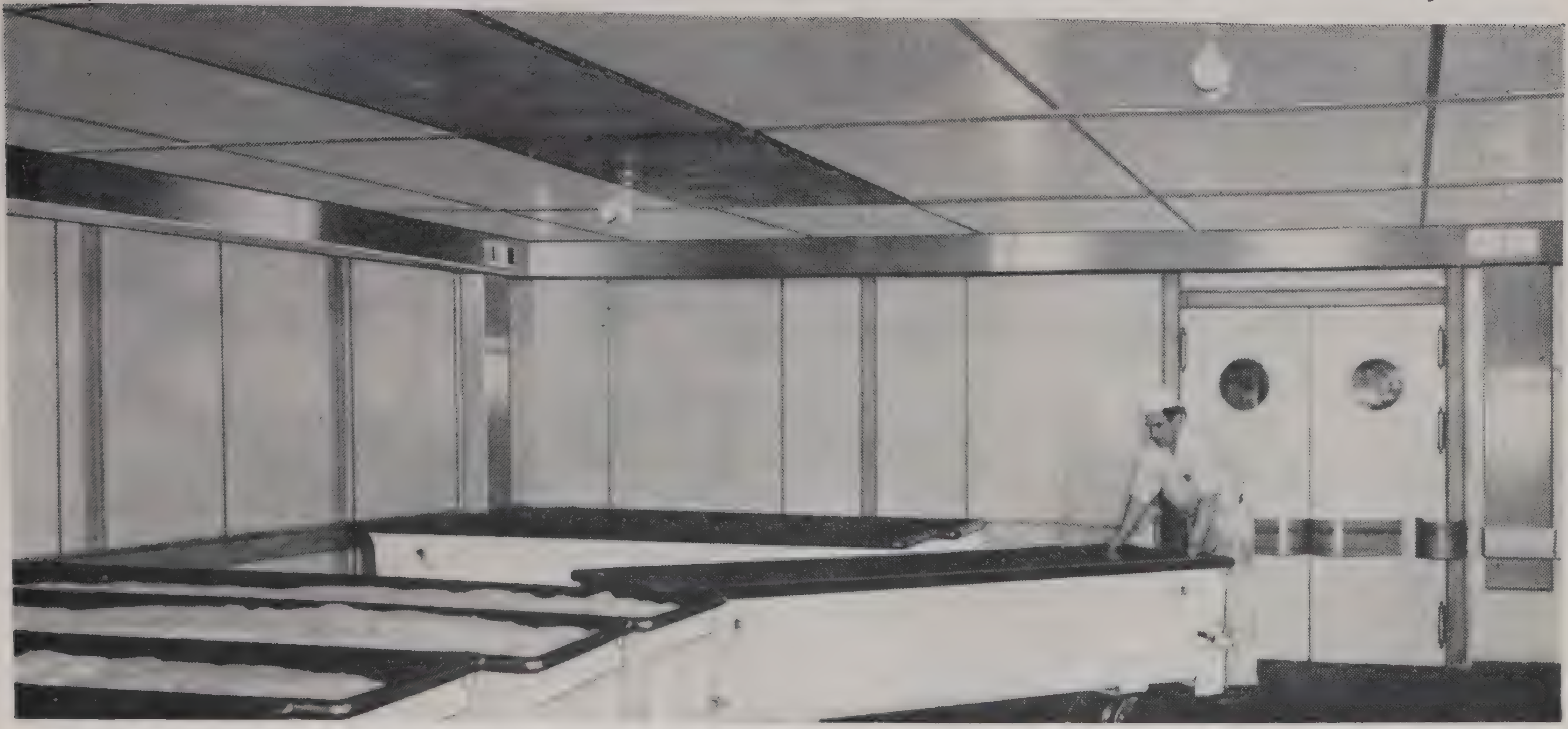
Regardless of installations of pneumatic or semi-bulk systems, a certain amount of conventional flour-handling equipment still remains in every bakery. Although no revolutionary changes have taken place in dump bins, bucket elevators, screw conveyors, and other such apparatus, minor improvements have been many—probably more during the past year or two than in the preceding quarter century. These developments have been almost exclusively in the field of sanitation.

Bins Built for Easy Cleaning

Dump bins and blending bins are now constructed so that the casing below the conveyor worms can be opened, permitting cleaning straight through from above. Even screw conveyors, located close to the floor or running a few inches above the storage bin tops, are arranged so that the covers can be quickly removed. And the bottoms can also be removed or dropped on a hinge.

For anyone who has tried cleaning the U-trough around a helicoid flight, the advantages of cleaning straight through will be more than welcome. Overhead conveyor housings with hinged-bottom construction — which spilled flour all over adjacent areas when they were cleaned—are now being replaced by housings completely removable in short sections. These sections can be furnished in aluminum to facilitate handling, particularly in

Control Is Stressed in Fermentation . . . Troughs Now Dumped Automatically



Union Steel Products Co.

FERMENTATION ROOM is temperature and humidity controlled. Walls and ceiling are panel-constructed. Perforated section in ceiling (top left) assures low velocity recirculation of air, thereby reducing drafts and minimizing undesirable surface crusting of dough. Trend is toward greater use of fermentation rooms.

the twin-screw type of installations.

Removable sides on elevator trunkings permit accessibility to the entire interior for thorough cleaning of chain, buckets, and corners of casings. Various types of hand-operated latches and catches on casing panels and clean-out doors facilitate opening and replacing without use of tools. Danger of dropping loose bolts or nuts inside the flour system is also eliminated.

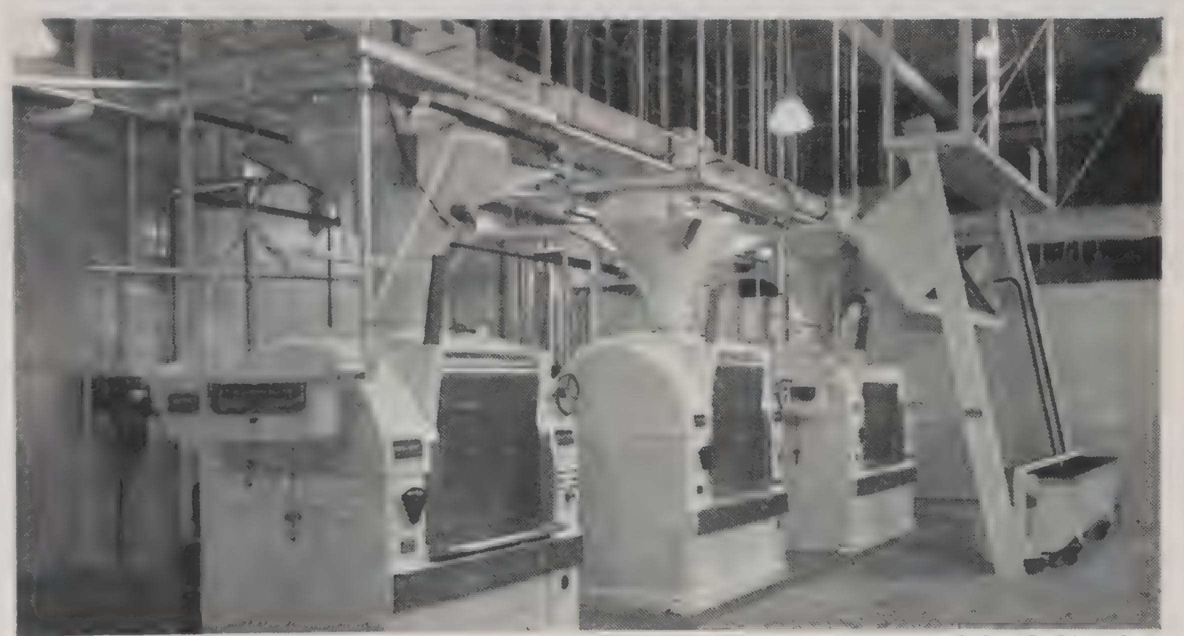
Combination vertical and horizontal conveyors with drag flights in split cylindrical casings, show promise of success. It is claimed that this type is more nearly self-cleaning.

Brush-type sifters are gradually becoming obsolete. Bristles from the brushes frequently get into a loaf of bread or a coffee ring. Furthermore, other foreign matter, instead of being separated and removed from the raw material, was usually ground up and forced through the sieve.

Efficiency of vibrating sifters has been improved to the point where high rates of flow, through finer mesh screens, assure efficient flour sifting. The gyro-type sifter, with multiple screens to reduce floor space and headroom, is now available in all-metal construction.

It is in the flour-handling system of the bakery where infestation—Enemy No. 1—generally occurs. Manufacturers are making great progress in producing equipment with a minimum of interior obstructions and inaccessible corners. Moreover, strategically located openings are being provided for the introduction of fumigants.

It can be seen that good facilities for cleanliness are available. And as more and more bakeries adopt the improved methods, product quality goes up.



Baker Perkins, Inc.

TROUGH HOIST (right) raises trough off floor and returns sponge into dough mixer, thus eliminating manual handling. Other two units are sponge mixers.

Losses Controlled in Scaling Department

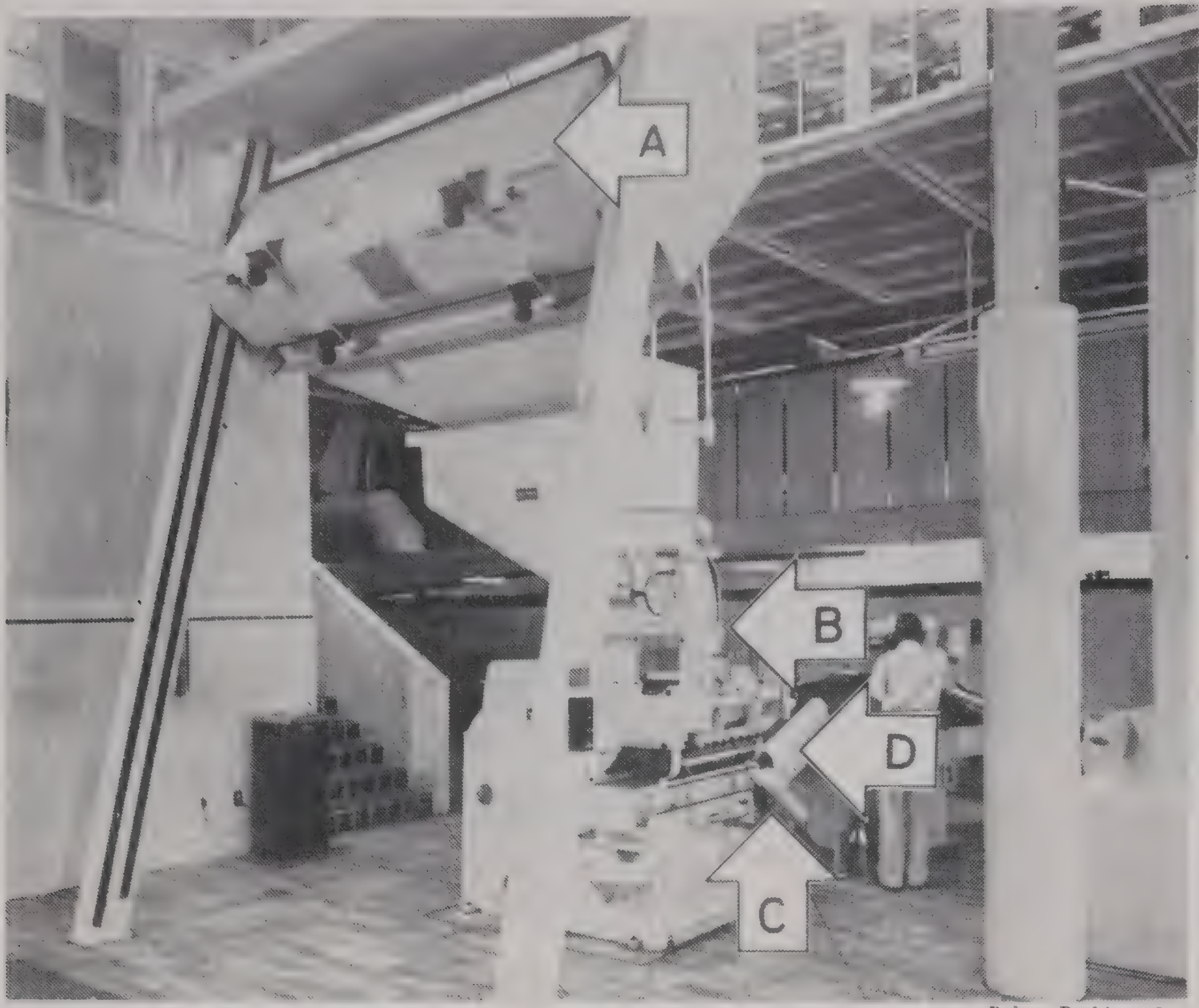
Recently scaling departments have been receiving considerable attention from management. Many so-called "unaccounted losses" are now being accounted by systematizing and controlling the transition of ingredients from stock to production. The old losses are being cut down by the aid of perpetual inventories, stock withdrawal forms, formula cards, and other ingredient records. But, in the last analysis, it is the men who do the scaling and enter the figures on the records that make this control a success.

Now let us consider developments in the scaling department. First, for handling miscellaneous ingredients—salt, baking powder, powdered milk and cocoa. Some of the newer plants have had special equipment designed and built to handle these items. But, in general, equipment manufacturers have been rather slow in making standard units available to the industry.

On the other hand, for scaling flour there have been some improvements in the dustless, ventilated types of weigh hoppers. In addition to dropping a charge of flour into a mixer without blowing dust, these hoppers are now designed so that vent parts are accessible for cleaning. Moving collars and annular rings can be taken off for washing and sterilizing with steam.

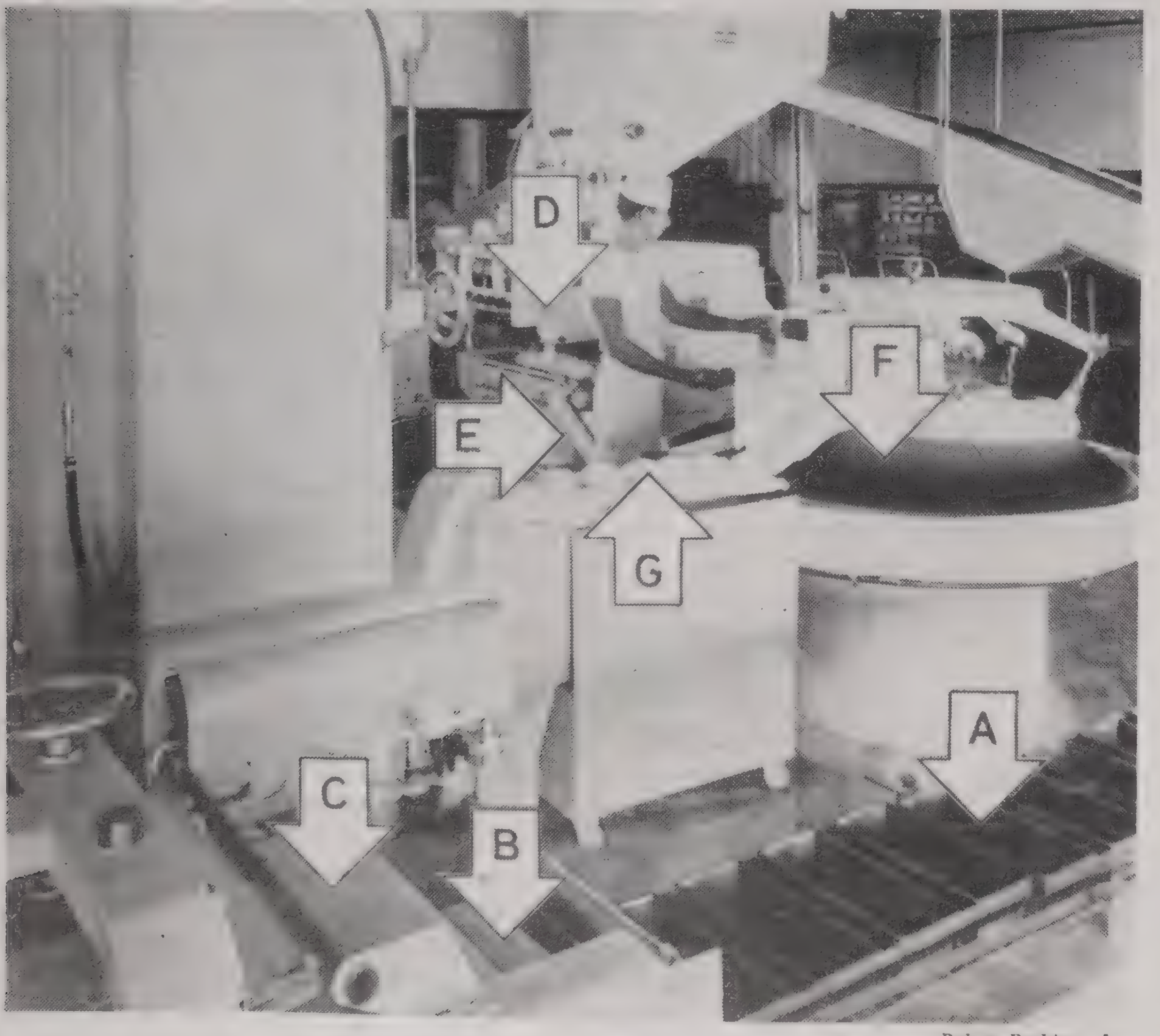
In many cake plants, granulated sugar is now being handled and scaled in equipment similar to that used for flour. Where liquid sugar is being used in large quantities, re-calibrated water meters are being used.

Air Dusting and Automatic Panning Pare Costs



Baker Perkins, Inc.

HERE, trough is hoisted (A) and dough dumped into 8-pocket divider (B). "Air duster" (C) is for divider, and air duster (D) is used for the loaf rounder.



Baker Perkins, Inc.

AUTOMATIC pan filler. Empties (A) go to panner (B), which receives dough from molder conveyor (C). Line of pans continues under conveyor belt to final proofer. Also seen is dough coming from divider (D), air duster for divider (E), and loaf rounder (F). Balls of dough (G) are going to dry proofer.

With such an installation, piping connections for periodic washing out with hot water should be provided. Installation of a special disk in the meter helps it withstand this type of service.

Although wooden barrels and containers for miscellaneous ingredients have been replaced with tight-covered metal ones, there still is room for improvement. In most bakeries, these metal bins (on casters) are never allowed to become empty. When most of the ingredient has been used, a new supply is loaded into the bin so that an accumulation, which is never disturbed, remains in the bottom.

This residue offers a breeding place for insect infestation. If containers of this type are used, they should be emptied and cleaned out periodically. In addition, all new material should be sifted into the bin.

Newly designed equipment for holding miscellaneous dry ingredients is built high off the floor. Hence, material can be scooped out of bottom openings. This assures the desirable "first in, first out" feature. Round corners and absence of cracks and crevices are important details.

Drum and bottle racks are essential in sanitary storage of liquid ingredients. Quick-opening and tight-closing spigots, plus stainless steel drip pans for each drum of molasses or syrup, do away with unsanitary drippings.

Rapid Strides Made With Mixers

In larger plants with high production rates, separate batteries of high-speed mixers prepare the sponges and doughs. Trough hoists for returning sponges to the mixer are being used a great deal, even where sponge mixing and dough mixing operations are not completely separated. Mixers are being operated at higher speeds than formerly. For this reason, cold water for the batches, as well as more efficient jacket cooling is of great importance.

The trend is away from the central refrigerating plant with large water storage tanks. Small packaged units for each mixer or each pair of mixers are coming to the fore. So-called instantaneous water coolers, with comparatively small storage capacity, produce 34 deg. F. water almost as the demand requires. Cooled water is piped to the meter and thence to mixers. Tanks and cooling coils should be of stainless steel, and the assembly should be arranged for accessibility and ease of cleaning.

There is also a marked trend toward premixing, emulsifying, or homogenizing some of the minor ingredients. These operations shorten final mixing time and assure more uniform distribution in the final product. The method is particularly applicable to the separate preparation of slurries containing one or more ingredients, such as yeast, shortening, sugar, malt, and salt.

Surprisingly enough, a great number of bakeries are still using crushed ice to hold down sponge and dough temperatures during warm weather. Either direct-expansion mixer jackets or circulation of anti-freeze solutions at low temperatures will eliminate this undesirable practice. Here again, small individual compressors or packaged units, automatically called into service on demand, afford more efficient operation. In addition, more accurate control is attained, regardless of weather conditions.

The rapid strides being made with continuous mixers are particularly noteworthy. Although much experimental work is yet to be done in the yeast-raised field, continuous mixing of marshmallow, certain types of icings, and cake batters is now possible.

Naturally, continuous production is feasible only where a single formula can be run for an appreciable time. Combinations of auxiliary equipment, including premix tanks, dry- and liquid-feeders, and storage bins and tanks, must be engineered for each application.

Fermentation Rooms Favored

Controversy between room and cabinet fermentation still goes on. With no intention of reviving agitation, we must report that the tendency seems to be in favor of the room type—controlled fermentation rooms.

Air conditioning equipment, with ducts to multi-inlets, supplies large volumes of treated air at low velocities. The elimination of drafts and the maintenance of proper humidity, minimize crusting and moisture losses from fermenting doughs. To combine with this method the advantage of cabinet fermentation, there are now available hinged and counterbalanced stainless steel trough covers—placed over the dough troughs in the fermentation room. In this manner, there is maintained the desirable CO_2-layer contact with the dough surface.

Divider Plays Important Role

In plants where it is not possible to drop doughs through chutes from the floor above, use of a trough hoist to fill the divider hopper is becoming common practice. Specially designed troughs are being used to avoid possibility of foreign matter dropping into dough hoppers from trough casters. The tub is separate from, but rests in, a cradle frame on casters so that the hoist picks up the tub only, leaving the dolly frame on the floor.

Accurate scaling at the divider is being generally recognized as playing an important part in maintaining a profitable operation and keeping the balance sheet straight. Therefore, greater efforts are being made to produce machines that scale with accuracy. Use of non-corrosive materials for heads, pistons, plungers, and other parts of dividers in contact with the dough, reduces corrosion and leakage. Also, substitution of compressed air for much of the dusting flour customarily used on the divider and rounder, is meeting with success.

Many new, queer-looking molders have been introduced—and the end is not yet in sight. Conventional molders are being replaced by machines for cross graining and these are going through further modifications. After the dough goes through one set of rolls, it is flipped so as to travel in the opposite direction through the second set of rolls. This supposedly overcomes the objection of the "wet end and the dry end" of the dough. Following this operation, there are various schemes for cross-curling the dough, either loose or tight.

Combined with the molding equipment, there are now several varieties of automatic panners. Electronic devices and mechanical trips not only assure each pan being loaded, but the dough-loaf is automatically centered and placed with the seam down.

Make-up tables with sheeters, curlers, cutters and devices for sprinkling cinnamon, nuts or raisins, have long been available for making yeast-raised sweet goods. Dough retarding practices probably are the biggest single factor in reducing waste and loss in this department. Although dough retarding is not new, it is certainly revolutionary in its present application.

There follows a brief resumé of dough retarding:

Depending upon shop conditions and production requirements, either bulk dough or made-up units can be refrigerated. In the former method, 10- to 15-lb. pieces of dough are placed in individual pans. In the latter method, the made-up coffee rings, sweet buns, or other products, are placed on sheet pans. In either case, the pans may be carried into a walk-in box and placed on racks, or the pans may be slipped into the racks of a reach-in box.

The rate the dough is retarded may be controlled by: (1) Richness of formula, with retardation more pronounced the richer the formula; (2) temperature of dough going into the box, with retardation being more pronounced in cooler doughs; and (3) thickness of dough-piece, with greater retardation in thinner pieces.

It has been found that 35 deg. F. and 85 percent relative humidity provide the optimum condition within the box. The refrigerating equipment should be of sufficient capacity to bring the products quickly to this temperature and r. h.

More warm air is admitted by opening a large door of a walk-in box than by opening the small door of a compartment reach-in box. Obviously, the work load placed upon the refrigerating equipment will be greater when a whole rack is rolled into a walk-in box at one time.

Manufacturers of retarding boxes offer many sizes and types to suit individual requirements. Both the inside and outside walls of these boxes are easily cleaned. Walls, roof and doors are adequately insulated. To maintain uniform conditions, temperature and humidity are automatically controlled with a circulating fan. Built-in racks are designed to facilitate manipulation of the pans and to allow ample space for air circulation.

Where made-up units of dough are retarded, they should be brought out and allowed to reach room temperature before being proofed for baking. When using the bulk methods, the dough probably will have reached room temperature while being made up. Then the products are immediately ready to be proofed and baked.

Silicone-Coated Pan Is Radical Change

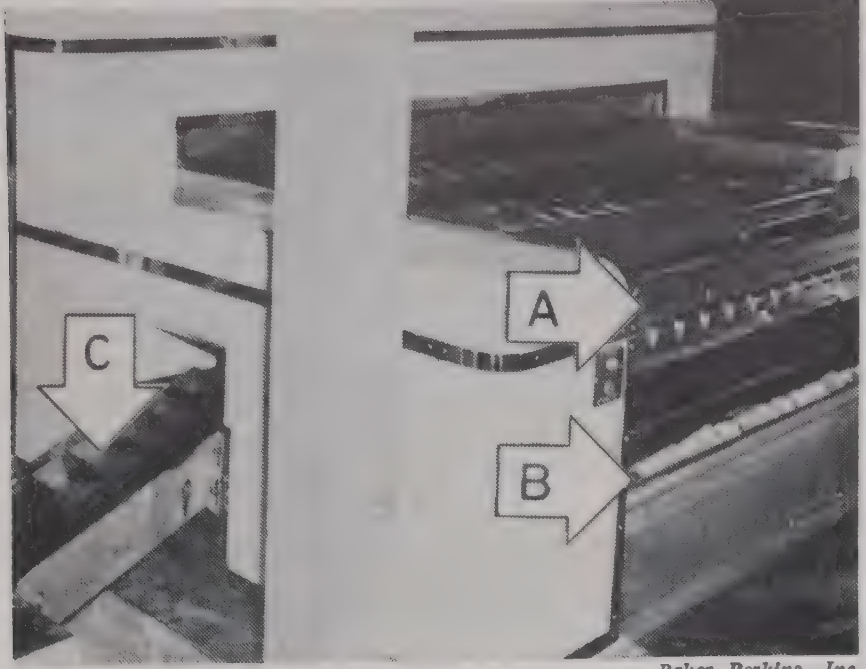
Recent advent of silicone coatings for bread and bun pans might almost be termed a revolutionary step. Since these coatings bid fair to relieve bakers of pan greasing—one of their most tedious and objectionable tasks—they were quick to try them out. But first reports of their use weren't favorable. Some bakers gave up the coatings almost immediately. Others persisted, however, and with cooperation from manufacturers of these silicones, they have now developed a successful procedure.

To obtain the satisfactory 100 to 200 bakings from a single application of the coating, it is necessary to follow the manufacturer's instructions very carefully. Also, shop conditions, formulas, and schedules may require slight modifications.

Briefly, the recommended procedure is: (1) Burn out new pans, as recommended by the pan manufacturers; (2) straighten out dents in old pans; (3) clean, rinse and dry the pans; (4) dip or spray the pans with the coating in a well-ventilated space and away from open flames; (5) drain off excess coating; (6) air-dry the inverted pans for several hours (until the surfaces are no longer tacky) at a place where they will not collect dust, grease or finger prints; (7) cure the pans, preferably in a tray oven at 425 deg. F. for at least 4 hr., and (8) allow pans to cool, not nested.

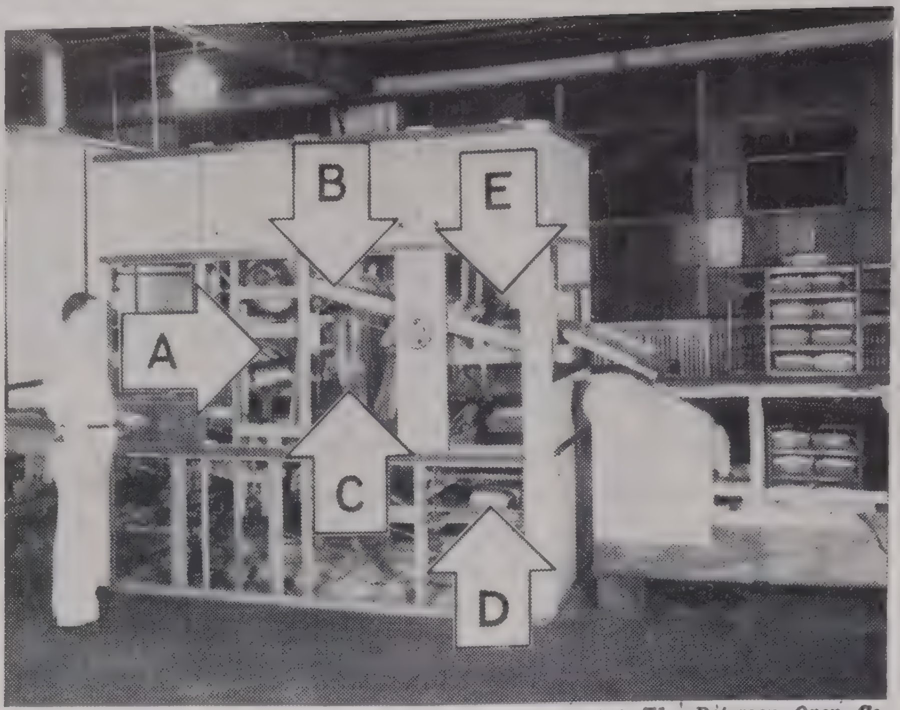
Free release of baked goods from coated pans may be adversely affected by careless handling of pans, causing cracking or chipping of the glass-like coated surfaces. Doughs should not contain too large quantities of sugars or syrups, and they should be kept on the stiff side (not slack). Excessive humidity in proof boxes and large volumes of steam in the baking chamber will also adversely affect free release of baked goods from pans.

Bread Depanning Operation Has Been Mechanized



Baker Perkins, Inc.

BREAD DEPANNER, at end of tunnel oven. On reaching turnover device (A), row of pans is inverted and bread drops into front turnover chute (B). Empties (C) are discharged to conveyor to be carried back to molder.



The Petersen Oven Co.

DEPANNER with side panels removed. In this unit, pan bread (A) is carried to knock-out position (B), where pan is inverted. Bread slides down chute (C) to conveyor (D). Empty pans are discharged at (E).

Successful use of silicone coatings saves labor and material formerly needed to grease pans. Furthermore, these coatings improve cleanliness and sanitation. Silicone coatings also reduce the haze created by grease fumes and smoke in oven rooms, thereby increasing the life of the paint on the walls and ceilings.

Commercial services, located in or near some of the larger cities, are available for bakers not equipped to coat their own pans, or those who have not been satisfied with their own attempts.

Pan-Greasing Gets Attention

Greasing of pans, with particular reference to cake shops, has also received attention from machinery makers. And there is now available improved equipment, that reduces labor and materials and increases speed and sanitation.

A comparatively recent development employs an ingenious method of spreading a controlled thickness of grease on a nylon mesh belt. High-pressure air, blowing through the belt, sprays the pans as they pass below. There are no spray nozzles to become clogged, and the operators are not subjected to a grease mist.

Heavy or light applications of grease can be obtained by varying the thickness of the layer spread on the nylon belt, the air pressure, and the speed of the pan conveyor. Shields, to fit certain pans or strappings, may be used to keep the grease from non-baking surfaces.

In line with the general move toward greater mechanization, many tunnel and tray ovens are being equipped with automatic loading devices. Most of these are separate portable units which are rolled to the mouth of the oven and are then synchronized by a chain drive from the oven mechanism. The pusher bar either folds flat and returns over the top of the product or it drops down and returns below the pan shelf.

The latter arrangement, of course, permits slightly more time for the operator to set up the next row of pans. Automatic loading always assures a complete and uniform oven load, resulting in use of maximum capacity and a uniform product.

Most tray ovens, whether single or double lap, can be furnished with automatic unloaders. At a point before the tray returns to the oven door, bread pans are automatically taken from the shelves, then are removed through one side of the oven, on a metal conveyor belt.

Some manufacturers tip the entire tray unit. Others tip the flat shelf only, permitting the side frames to travel continuously in the stabilizer tracks. In another method, a separate pusher mechanism is employed to transfer the pan straps onto the discharge conveyor, while the tray continues its uninterrupted travel.

In all cases, the pan straps emerge from the side of the oven and are transferred to another conveyor that carries the panned bread to the dumping station. These automatic unloaders relieve congestion at the oven door. Also, the hot job of dumping bread is moved to a cooler and more convenient location.

One of the most recent steps toward an automatic bread shop is the development of automatic depanners. Like many obviously desirable inventions, announcement of the first commercial depanner was quickly followed by word of several similar devices. Although none has yet been in practical service very long, it may be said that automatic bread dumping is no longer an experimental dream.

Fundamentally, all the mechanisms perform a definite sequence of operations. First, strapped pans of bread are fed into the machine where the bread is dumped. And second, loaves come out uniformly on one conveyor, while pans come out right-side-up on another conveyor.

It is apparent that use of depanners in conjunction with automatic panner molders in plants using coated pans, and with automatic tray-type bread coolers, is extremely desirable. Therefore, speedy perfection of the automatic depanner is a "must." It is the link in bread-shop operations that will permit the nearest approach to complete mechanization.

The cycle is now complete, from the time the dough is dropped into the divider hopper until the finished loaf is wrapped and ready for packing. Time and experience will iron out the kinks.

Although present equipment is limited to open-top pan bread, developments are under way which will widen the application to so-called hearth breads baked on screens or in baskets and to pullman bread, where covers will be taken care of.

Continuous Coolers Popular

As stated earlier, we may dream of the "pushbutton bakery," but the fact remains that it is the "push-rack bakery" that is in overwhelming majority today. Hence, the man who visits a bakery about midnight, generally finds it almost impossible to squirm his way through the maze of loaded bread racks backed behind the slicing machines.

For satisfactory slicing and retardation of mold growth, bread must first be cooled. Without discussing the optimum temperature at which a loaf of bread should be sliced, we may safely say that at some periods during the year, the bread must remain on racks for an abnormal length of time. Otherwise bread is sliced too warm.

By using "manufactured weather," standard schedules can be maintained regardless of season. Furthermore, with danger of molds minimized, shelf-life will be extended. And the amount of available floor space will be increased.

The tunnel-type bread cooler is basically an enclosure with air conditioning equipment. Either by cross-current, or counter-current flow, hot bread on racks entering at one end of the cooler is progressively cooled as it approaches the exit doors. A predetermined standard time (usually about 1½ hr.) is a constant requirement, regardless of outside weather conditions.

One manufacturer recently modified the previously tried almost-instantaneous vacuum-type bread cooler. This new version, much larger than the original single-rack box, functions continuously with considerable reduction in the drastic vacuum effect. It is claimed that this unit will perform satisfactory cooling in less than half the time required by conventional tunnel-type coolers. This equipment is still in the experimental stage.

Traveling conveyor-type bread coolers are becoming more prevalent in large-scale operations, where they are employed in conjunction with ovens or without automatic unloaders and depanners. Loaves of bread, lined up on a feed conveyor, are automatically pushed onto the cooler shelves. These coolers may be suspended from the ceiling over the oven, from the ceiling of the floor below the oven, or mounted on the floor next to the oven.

In some cases, these conveyors are not enclosed and cooling is accomplished merely in time. A better method is to have the conveyor enclosed and the enclosure air-conditioned.

Cooling Conveyors Relieve Congestion

To reduce congestion caused by cooling racks in cake shops, various conveyors are being offered. One type uses a power-driven chain known as a live monorail. The chain travels on a track supported from the ceiling, and carriers equipped with shelves are suspended from this chain. These carriers pass close to the mouth of the oven. Here, they are loaded with the cake pans coming out of the oven. The conveyor then slopes toward the ceiling, leaving ample working headroom below.

After traveling several hundred feet back and forth, the carrier is brought down to an unloading point, where the cooled cake is dumped from the pans. In some cases, used pans are put back on the carriers to be carried to, or even through, a pan washer. Then, the pans are stacked ready for re-use.

Another type of conveyor, especially adaptable for cooling coffee cakes, buns and rolls, uses wire-slat belting. Loaded with depanned baked goods at the mouth of the oven, this conveyor first slopes up toward the ceiling, then spirals down in long ovals. It finally discharges to a finishing table or wrapping machine.

This type of cooler may be arranged so that one of the spiral-loops projects farther out than the rest of the loops. And the projected loop can be used to accommodate a station for icing coffee cakes in transit. The cakes continue on the remaining loops of the spiral until the icing is set, then finally are discharged directly to a wrapper.

A conveyor of this type can be assembled from individually powered 30-ft. straight sections and power-driven curves. Long-time travel is provided in a comparatively small floor space. And eliminated is all intermediate handling between the oven-dump station and the final wrapping station.

At present, most of these traveling conveyor-type coolers, lower the temperature of products merely because there is long length of travel. Speed is regulated to suit oven capacity. In plants where lack of room prevents required length of travel, the time element may be shortened by enclosing a portion of the conveyor in a cooling tunnel.

About Slicers and Wrappers

Some 20 years ago, when pre-slicing of bread first hit the American public, many considered it to be a fad that would pass. But, since then, slicing —and the equipment to do it—has really come a long way.

Today, the trend in new designs follows four general paths—speed, sanitation, safety, and flexibility. Heavy duty, streamlined machines slice loaves as fast as the wrapping machine can handle them. Band slicers or reciprocating types cut 50 to 60 loaves per minute, with a minimum of crumbs. All moving parts are guarded with safety interlocks, and the interior corners and crevices are accessible for cleaning.

Demand in some markets for thin slices has created incentive for manufacturers to design equipment with adjustable blade spacing or interchangeable frames. However, to conserve set-up time, many of the larger bakers use separate slicing-wrapping units for standard slices, thin slices, raisin bread, and rye bread.

Demand for pre-cut buns and rolls, by snack-bars and hot-dog stands, has resulted in the development of automatic equipment to handle whole baskets of these products at a high rate and low cost. Adjustable guides and hold-down plates align the rolls right-side-up and feed them through disk knives. Each roll or bun is left with an uncut hinge of any desired width.

For the retail trade, a machine is offered to cut hamburger buns six at a time and place them edgewise in a carton ready for the wrapper. A pan of rolls is carefully dumped onto the conveyor in-feed. Spacer guides are arranged so that six streams of rolls move toward the cutter head. As the rolls progress, they are automatically turned on edge before passing through the disk-knife blades. A flat folded tray, delivered from a cartridge feed, is opened automatically, and the six rolls set in. An intermittent conveyor can be arranged to carry the package to the wrapper in-feed.

Because merchandising surveys have shown that many sales of baked goods are the result of impulse buying, packaging has assumed a major role. In fact, the packaging field is so broad and complex that it may be considered to be a whole separate subject. In any event, the standard bread-wrapping units and cake-packaging machines are keeping pace with the trends. Outsert and insert attachments, end-seal applicators, and label printers offer new opportunities for winning more customers.

Pans Washed Automatically

Because of availability of good washing machines, the cake shops fare better than bread shops. Clean pans are the best insurance of good flavor. In many better cake bakeries, all pans are washed after each use. Direct from the cake dumping station, pans are conveyed or trucked to the panwasher.

A two-man washer consists of a feed extension, washer, rinser, air blow-off, dryer and take-off. Careful alignment of spray nozzles in the wash and rinse sections, with a dead space between, prevents excessive dilution of the cleaning solution. Contamination of the rinse water with cleaning compound is also prevented. Double screens in the solution tanks, with continuous skimming baffles, assure maximum efficiency in the wash section with minimum shut-down for cleanout.

Restriction in the lower spray-nozzle pipe (a control valve) or an increase in the number of upper spray nozzles, eliminates the necessity for a hold-down grid. Large volumes of fairly high pressure air, discharged at proper angle through nozzles adjustable to pan heights, remove most of the water that collects in rims and corners of pan sets. A short vented section, between blow-off and dryer, keeps moist vapors out of the dryer sections. It also permits higher efficiency per Btu. of heat input to assure dry pans at the take-off.

Increasing the length of the discharge conveyor as a cooling section is a recent improvement. A fan blows large volumes of low pressure air on hot pans as they come out of the dryer. In so doing, it removes all traces of moisture and cools the pans so that they can be handled easily.

In most cases, the tunnel is high enough to handle the 80-qt. bowls used on the cake mixers. Bakers using store display pans or metal delivery boxes, set up a special schedule to send them through the washing machine. In cases where rack washers are not available, rack shelves can be cleaned in these machines.

Where live monorail cake-cooling conveyors have been installed, specially constructed washing machines are tied into the travel circuit. From the cake dumping station, carriers with dirty pans are conveyed through a tunnel-type washer. Pans are then stacked for greasing. The success of this novel practice is still not definitely proven. However, it does offer a possibility of eliminating one of the more disagreeable jobs in cakeshops.

For smaller cake shops with fewer pans, there are several types of one-man pan washers. Machines with either U-traveling conveyor belts or a circular table rotating on a center shaft permit an operator to load dirty pans and remove clean ones from one work station. However, even in these small units, washing, rinsing, and drying are performed. To increase the capacity of the rotating table-type machines, sheet pans are loaded on edge.

Accumulation in pans of burnt grease and charred crumbs now comes under the inspector's category of "filth." Some bakers are beginning to toy with the idea of treating bread pans almost on the same basis as cake pans. Even though it may not be necessary or desirable to wash bread pans after each use, it may be found that once a day or once a week is the best schedule. Just what effect this frequent pan washing will have on the finished baked loaf is something else to find out.

Exactly what procedure will be evolved as standard practice, is not known at this time. But we do know this—something a lot better than many bakers have done, heretofore, seems almost certain to be adopted.

Improved Rack Washers

Rack washers, too, have come in for special sanitary attention. It is not sufficient merely to spray the racks with a solution of cleaning compound and call the job complete. For recent investigations point out the possibility that cleaning-compound residues which remain on rack shelves after they are washed can contaminate bread later cooled on them.

Some manufacturers now provide rinsers as standard equipment on rack washers. Others even go a step further. They have made arrangements for steam-sterilizing.

Some manufacturers fabricate the main housing of rack washing equipment of stainless steel for beauty as well as long-life. Thus, unsightly rack washers of yesterday are now superseded. In almost all cases, the side panels have water-tight lock seam joints. Drip-baffles keep the doors water-tight. High-grade chrome-plated hardware, large capacity heavy duty pumps, and provisions for cleaning the solution tanks conveniently, are other improvements in modern rack washers.

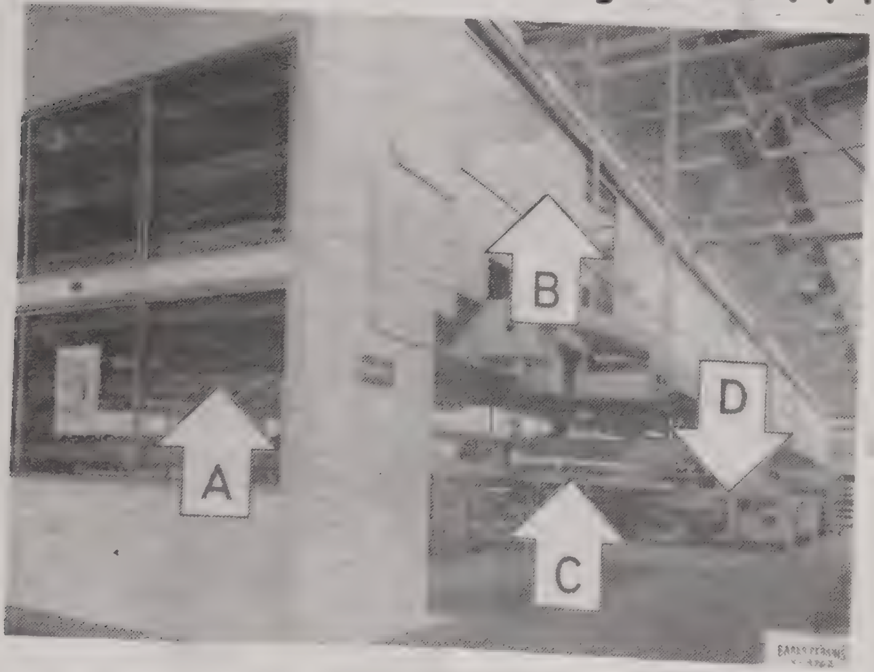
It is almost impossible to mention all new machines, improved equipment, or modern methods available to progressive bakeries. These improvements run the gamut from self-contained steam generators to electronic control devices. Just a few of the things to consider in planning a bakery or in carrying out a modernization program are: (1) Glazed wall bricks and smooth durable floor tile; (2) insulating materials for floors, roofs, refrigerators, freezers and holding boxes; (3) ventilating fans; (4) lighting fixtures; and (5) sanitary sinks and wash basins.

A judicious selection of conveyors alone can work wonders in eliminating congestion and resurrecting valuable floor space. There are innumerable types and designs of special conveyors for make-up benches and icing tables. Added are stainless-steel work stations and rubber or plastic-coated sanitary food belts. Single- or tiered-type wire-slat conveyors carry finished goods single file from wrapping machines to truck-loading docks. These conveyors travel around corners, over doorways, or up or down from floor to floor, carrying material from one place to another, doing away with the need to push racks.

In an endeavor to cover all phases of baking in a limited amount of space, only the high spots could be touched. Apologies must be made for any omissions.

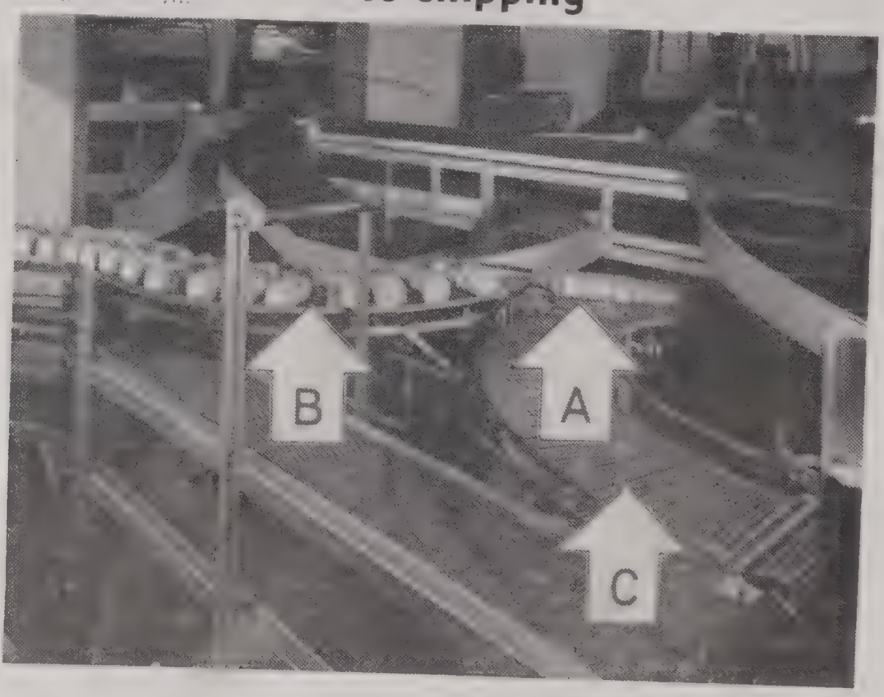
Many new machines and improvements of old ones are still in the experimental stage. Undoubtedly some will be unveiled soon.

Last Lap: Bread goes in big cooler . . . . . . and then on to shipping



Baker Perkins, Inc.

MULTI-TIER UNIT is used to cool bread within 1½ hours. Up-leg (A) carries bread to top tier. Bread travels back and forth through cooler (B), then is conveyed to pick-off table (C), and finally to slicing and wrapping machines (D).



Union Steel Products Company

THREE TIERS of Wendway conveyors deliver wrapped bread to different stations of shipping dock. Canvas belt (A) switches bread to wire-belt conveyors (B) or (C). Two tiers (foreground) carry loaves to other areas.

RUIT GROWERS EXPRE

Wide World

Yes, these potatoes are in A-1 condition when first received by the processor

—But How Good Will They Be After Storage?

This salient question posed by chip maker and dehydrator gets fresh consideration as new light is thrown on changes that occur when tubers are "kept under 40"

R. C. WRIGHT, T. M. WHITEMAN, J. S. CALDWELL,

C. W. CULPEPPER and MARGARET C. HUTCHINS

Respectively, physiologist, assistant horticulturist, senior physiologist, physiologist, and junior physiologist, Division of Fruit & Vegetable Crops & Diseases, Bureau of Plant Industry, Soils & Agricultural Engineering, Agricultural Research Administration, USDA.

Potato chip manufacturers, potato dehydrators, and other processors, sometimes have difficulty in conditioning stored potatoes so that they become suitable for use. Since the tubers often become undesirably sweet because of sugar development during low temperature storage, it has been customary to recommend that they be conditioned "by holding for a week or so at about 60 deg. F."

True, this conditioning procedure has given satisfactory results under certain conditions. It is now to be noted, however, that recently acquired evidence shows that storage below 40 deg. F. for more than a few days is likely to result in potatoes that are unsatisfactory for processing—regardless of subsequent attempts to condition them.

Furthermore, there are several other pertinent aspects to the conditioning problem, and these will be related in the following paragraphs.

In a previous publication[*], we reported the results of an investigation concerning the effect of different storage temperatures on the quality of potatoes when dehydrated. It was shown that the best table quality was obtained when the different varieties were stored at 50 or 60 deg. F. whereas the poorest quality and highest content of sugar were found in those kept at 32 deg. F. storage.

Now, the authors have extended this investigation to a study of the conditioning of potatoes of poor table quality because of high sugar content.

During this study, we used three varieties of potatoes—Green Mountain, Katahdin, and Earlaine No. 2—all grown near Presque Isle, Me. The potatoes were dug when fully mature, and shipped immediately to the Plant Industry Station, Beltsville, Md.

Quantities of each variety were stored at 32, 36, and 40 deg. F., and at intervals of 2, 4, and 8 weeks after beginning of storage, portions of these were transferred from each temperature to a conditioning room held at 60 deg. F. Then, after 2, 4 and 6 weeks in the conditioning room, these transferred lots were dehydrated and, after a period of storage, the dehydrated material was reconstituted, cooked, and scored as to color, texture, flavor and over-all desirability or table quality.

All Cooked at One Time

Determinations of starch and sugar content (as shown in Tables II and IV) were made (1) at the beginning of the storage period, (2) at the time of transfer to the conditioning room, and

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[*] *The American Potato Journal,* Vol. 22, No. 10, pp. 311-323, Oct. 1945.

TABLE I—Starch and sugar content (percent), and general desirability of three varieties of potatoes after 4 and 8 weeks of continuous storage at 50 deg. F. and at 60 deg. F.

Variety	Weeks in Storage	50 Deg. F. Storage					60 Deg. F. Storage				
		Starch	Total Sugar	Reducing Sugar	Sucrose	General Desirability	Starch	Total Sugar	Reducing Sugar	Sucrose	General Desirability
Green Mountain..............	4	.....	....	....	....	Good	.....	....	....	....	Fair
	8	11.30	0.14	0.13	0.01	Good	11.60	0.13	0.12	0.01	Fair
Katahdin....................	4	.....	....	....	....	Fair	.....	....	....	....	Poor
	8	13.87	0.55	0.39	0.16	Good	12.31	0.38	0.15	0.23	Good
Earlaine No. 2...............	4	.....	....	....	....	Good	.....	....	....	....	Fair
	8	10.77	0.31	0.14	0.17	Fair	9.68	0.12	0.02	0.10	Fair

TABLE II—Average starch and sugar content (percent) of three varieties of potatoes taken from storage after 2, 4, and 8 weeks and held in conditioning room at 60 deg. F. for 0, 1, 2, 3, 4, and 6 weeks, respectively. All sugars expressed as percent dextrose.

Weeks in Storage	Weeks in Conditioning Room	From 32 F. Storage				From 36 F. Storage				From 40 F. Storage			
		Starch	Total Sugar	Reducing Sugar	Sucrose	Starch	Total Sugar	Reducing Sugar	Sucrose	Starch	Total Sugar	Reducing Sugar	Sucrose
Moved after 2 weeks in storage..	0	10.96	1.82	0.68	1.14	11.27	2.15	0.88	1.27	.....	....	....	....
	1	10.52	1.91	0.89	1.02	9.69	1.80	0.94	0.87	.....	....	....	....
	2	10.59	1.50	0.79	0.71	10.98	1.27	0.87	0.40	.....	....	....	....
	3	10.45	1.38	0.80	0.57	10.82	1.23	0.89	0.34	.....	....	....	....
	4	11.03	0.89	0.57	0.33	11.25	0.84	0.60	0.24	.....	....	...	....
	6	11.27	0.64	0.50	0.14	10.57	0.67	0.55	0.12	.....	....	....	....
Moved after 4 weeks in storage..	0	9.61	3.72	1.41	2.31	10.00	3.01	1.59	1.42	10.09	1.31	0.97	0.34
	1	9.79	3.10	1.36	1.73	10.93	1.60	1.04	0.56	9.87	1.46	1.08	0.38
	2	10.10	2.07	0.97	1.10	10.86	1.32	0.96	0.36	11.08	0.78	0.63	0.15
	3	10.45	1.68	0.81	0.87	11.31	1.07	0.85	0.21	10.98	0.70	0.60	0.11
	4	10.19	1.36	0.71	0.65	10.81	0.87	0.69	0.18	11.34	0.67	0.54	0.09
	6	10.74	0.85	0.57	0.28	10.09	0.56	0.30	0.11	10.57	0.57	0.43	0.14
Moved after 8 weeks in storage..	0	7.95	5.05	2.03	1.03	6.18	2.84	1.98	0.86	10.73	1.08	0.85	0.23
	1	10.87	2.27	1.21	1.06	8.75	1.25	0.92	0.33	.....	....	....	....
	2	9.23	2.28	1.34	0.94	10.40	1.27	0.92	0.35	10.38	0.66	0.54	0.12
	3	10.02	1.45	0.99	0.69	10.94	1.08	0.83	0.25	11.57	0.72	0.54	0.17
	4	9.88	1.12	0.75	0.56	11.52	0.91	0.64	0.27	12.14	0.61	0.47	0.14
	6	10.43	0.92	0.60	0.47	10.43	0.63	0.50	0.12	12.26	0.53	0.41	0.12

TABLE III—Average general desirability for three varieties of potatoes dehydrated after storage of 2, 4, and 8 weeks and after different periods in conditioning room held at 60 deg. F.

Storage Lot	32 F. Storage Weeks in Conditioning Room				36 F. Storage Weeks in Conditioning Room				40 F. Storage Weeks in Conditioning Room				50 F. Storage	60 F. Storage
	0	2	4	6	0	2	4	6	0	2	4	6		
Moved after 2 weeks storage.............	Fair	Good	Fair	Fair	Fair	Fair	Fair	Fair	....	....	....	....	....	....
Moved after 4 weeks storage.............	Fair	Poor	Poor	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Fair	Fair
Moved after 8 weeks storage.............	Very Poor	Fair	Fair	Fair	Poor	Good	Good	Fair	Good	Fair	Good	Good	Good	Fair

(3) at weekly intervals during the conditioning period. Like determinations were made upon portions of the material after 8 weeks of continuous storage at 60 and 50 deg. F. (Table I).

It was essential to accuracy that samples of the original unstored stock and of material from all the various storage treatments be prepared and cooked at one time. Thus, direct comparisons could be made.

All material was consequently dehydrated and held until completion of the experiments, when it was reconstituted, cooked, and scored. It is believed that this method of comparison gave a fair evaluation of the quality of the various lots—not only as to dehydration, but also as to suitability for use in making potato chips and for the usual culinary purposes.

In the potatoes stored at 32, 36, and 40 deg. F., the sugar content usually increased progressively with the increase in length of the storage period—most rapidly at 32 deg. and most slowly at 40 deg.

Sweetness Down, But Flavor Abnormal

When the various lots were transferred to the conditioning temperature of 60 deg., there were fairly consistent decreases in sugar, accompanied by somewhat erratic increases in starch. There appeared to be no consistent correlation between these changes and over-all changes in table quality. The desired reduction in sweetness was accompanied by the development of an abnormal flavor and an increase in susceptibility to discoloration. Both of these conditions lowered the scores on color and flavor, and consequently on over-all desirability.

The general desirability of the three conditioned varieties shown in Tables III and V was rated "Good to Very Good" before storage and remained

TABLE IV—Percent of sugar and starch in three varieties of potatoes taken from storage after 2, 4, and 8 weeks, and held in conditioning room at 60 deg. F. for 0, 1, 2, 3, 4 and 6 weeks, respectively. Sugars expressed as percent dextrose on fresh-weight basis.

		Green Mountain[1]				Katahdin[2]				Earlaine No. 2[3]			
		32 F.		40 F.		32 F.		40 F.		32 F.		40 F.	
Weeks in Storage	Weeks in Conditioning Room	Starch	Tot. Sugar	Starch	Tot. Sugar	Starch	Tot. Sugar	Starch	Tot. Sugar	Starch	Tot. Sugar	Starch	Tot. Sugar
Moved after 2 weeks in storage................	0	11.00	1.88	.....	....	10.89	2.62	.....	....	10.98	0.96	.....	....
	1	11.21	2.10	.....	....	10.94	2.10	.....	....	9.40	1.54	.....	....
	2	11.56	1.46	.....	....	10.95	1.71	.....	....	9.25	1.33	.....	....
	3	11.73	1.38	.....	....	10.37	1.59	.....	....	9.24	1.16	.....	....
	4	11.98	0.84	.....	....	11.87	1.02	.....	....	9.23	0.83	.....	....
	6	12.26	0.74	.....	....	11.71	0.56	.....	....	9.85	0.61	.....	....
Moved after 4 weeks in storage	0	10.51	3.91	9.25	1.20	9.98	4.08	11.75	1.43	8.34	3.18	9.27	1.31
	1	10.59	3.27	10.10	1.10	9.43	3.36	10.27	2.29	9.34	2.66	9.25	1.00
	2	11.47	1.84	10.79	0.85	9.50	2.50	12.42	0.64	9.34	1.88	10.02	0.85
	3	11.73	1.69	11.58	0.72	10.65	1.75	11.33	0.66	8.96	1.59	10.02	0.72
	4	11.29	1.46	12.06	0.63	.....	1.35	10.92	0.72	9.10	1.26	11.04	....
	6	12.32	0.83	11.91	0.53	11.08	0.99	11.27	0.64	8.82	0.74	8.53	0.54
Moved after 8 weeks in storage................	0	9.59	5.09	11.05	0.93	7.86	5.39	11.57	1.15	6.40	4.68	9.58	1.16
	1	10.87	2.27	.....	....	.....	....	.....	....	.....	....	.....	....
	2	10.18	1.46	11.23	0.71	8.29	3.10	11.38	0.72	.....	....	8.53	0.54
	3	9.95	1.18	11.37	0.73	10.54	1.85	11.78	0.71	9.57	1.31	.....	....
	4	10.12	0.85	12.22	0.66	9.42	1.43	12.06	0.57	10.09	1.08	.....	....
	6	11.12	0.86	11.91	0.53	9.75	1.25	12.62	0.53	.....	0.64	.....	....

[1] Analysis before storage showed 11.66 percent starch, 0.36 percent total sugar.
[2] Analysis before storage, 13.54 percent starch, 0.12 percent total sugar.
[3] Analysis before storage, 11.50 percent starch, 0.08 percent total sugar.

TABLE V—Table quality rating of the cooked dehydrated product of three varieties of potatoes taken from storage after 2, 4 and 8 weeks, and held in conditioning room at 60 deg. F. for 0, 2, 4 and 6 weeks respectively.

		Green Mountain[1]		Katahdin[2]		Earlaine No. 2[3]	
Weeks in Storage	Weeks in Conditioning Room	32 F. Storage General Desirability	40 F. Storage General Desirability	32 F. Storage General Desirability	40 F. Storage General Desirability	32 F. Storage General Desirability	40 F. Storage General Desirability
Moved after 2 weeks in storage.............	0	Fair	......	Fair	......	Fair	......
	2	Fair	......	Good	......	Good	......
	4	Fair	......	Fair	......	Good	......
	6	Poor	......	Fair	......	Good	......
Moved after 4 weeks in storage.............	0	Fair	Very Good	Good	Good	Fair	Good
	2	Fair	Good	Fair	Fair	Poor	Fair
	4	Fair	Poor	Poor	Good	Very Poor	Fair
	6	Good	......	Poor	Poor	Good	Good
Moved after 8 weeks in storage.............	0	Very Poor	Good	Very Poor	Fair	Very Poor	......
	2	Good	Good	Poor	Fair	......	......
	4	Fair	Good	Very Good	Fair	Good	......
	6	Poor	Fair	Good	Good	Poor	......

[1] Table quality rating of these potatoes dehydrated before storage was: Color, very good; Texture, very good; Flavor, good; General desirability, very good
[2] Table quality rating of these potatoes dehydrated before storage was: Color, good; Texture, excellent; Flavor, very good; General desirability, very good
[3] Table quality rating of these potatoes dehydrated before storage was: Color, good; Texture, good; Flavor, good; General desirability, good.

"Good" after 8 weeks in 40 deg. F. storage. However, under the conditions of these experiments, there was in general little or no improvement in table quality when potatoes that had been stored at a temperature low enough, or for a period long enough, to cause an undesirable accumulation of sugar, were conditioned at 60 deg. F.

In some cases where an excess of sugar had accumulated as a result of storage at low temperatures, it appeared to be impossible to restore the tubers' original quality or to make them acceptable for specific uses by conditioning at 60 deg. F. In addition to the undesirable increase in sugars due to low temperature storage, there may be other associated changes within the potatoes that tend to inhibit the conditioning processes.

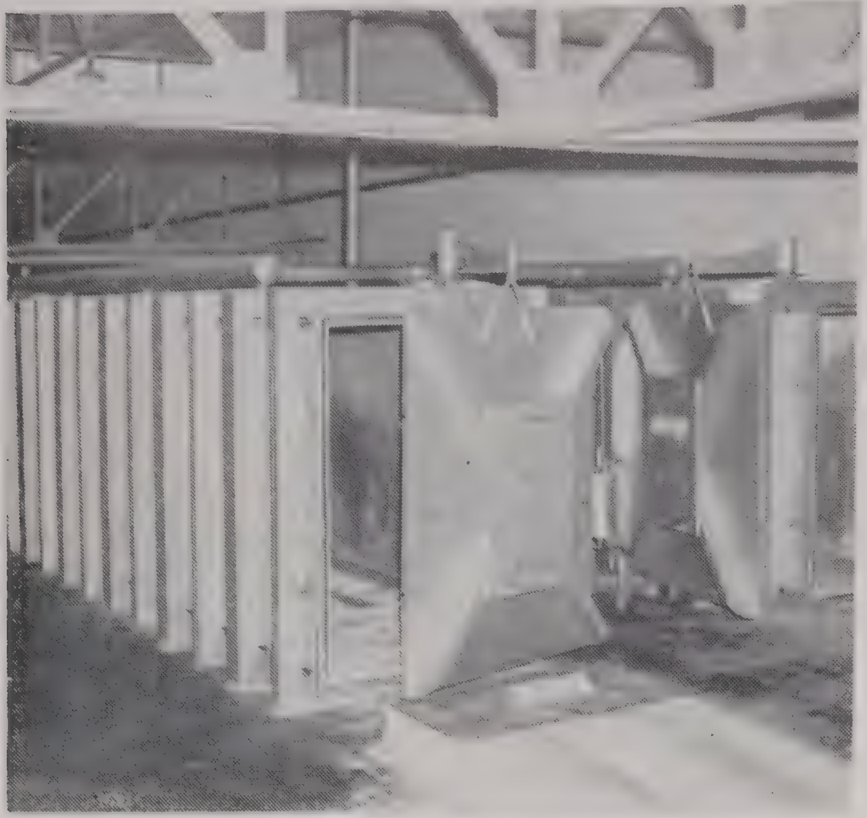
Doubt Effectiveness Under 40 Deg. F.

Thus, the results obtained, when attempting to condition potatoes after storage at too low temperatures, throw doubt on the effectiveness of this procedure—at least under the conditions described.

Although chemical determinations showed a fairly consistent reduction in sugar and a concurrent increase in starch in potatoes moved from temperatures of 32-36 deg. F. to a conditioning temperature of 60 deg. F., table quality in most cases was not measurably improved (see Tables III and V).

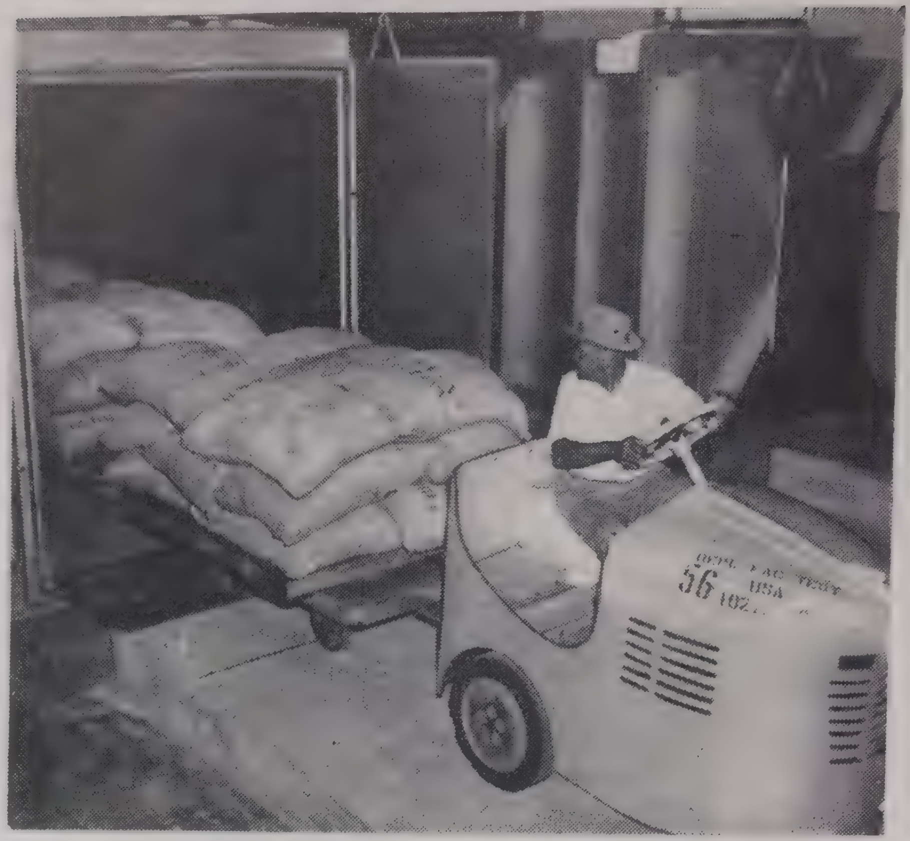
To further substantiate these investigations, potatoes that were stored at 36 and 40 deg. F. were transferred to 60 deg. F. and then were periodically tested by being made into potato chips. It was found that desirably colored chips could be made from those tubers that had been stored at 40 deg. and then conditioned, but that most of those from 36 deg. did not recover when conditioned at 60 deg. or higher.

After chamber doors are opened . . .



1 **DUAL** vacuum fumigation chambers ready for loading. Rectangular units are 50 x 8 x 6 ft. Construction is of 5/8-in. steel plate, reinforced with "I" beams.

. . . coffee beans go in one unit . . .



2 **TRACTOR-TRAILER,** with pallet loads of sacked coffee beans, drives up concrete ramp into vacuum Chamber No. 1. Tractor is then unhooked and moved out of unit.

QMC's Choice Is—Vacuum Fumigation

For in its fight against infestation, this was the one method that "scored a triple"—greatest kill, in shortest time, with fewest warehouse tie-ups

MURRAY B. STEPHENS

San Antonio, Tex.
(With U. S. Army Photos)

Four ways of controlling insect pests by fumigation—vacuum, area, bin, and ordinary vault—have now been carefully weighed by the Quartermaster Corps. And vacuum fumigation, the most technical of the four, has won the stamp of approval as the most effective and efficient system.

Granted, the other three ways were found satisfactory under many conditions, and fumigation of stacks of commodities under tarpaulins or in freight cars has also proven valuable. But for the major control job, it was "thumbs up" for the vacuum way—for here the kill is 100 percent, the cycles can be shortened, and hindrance to warehouse routine is minimized.

Briefly, the vacuum system comprises short-time fumigation of commodities in a specially constructed air-tight chamber, where first a high vacuum is drawn and then lethal gas is introduced. Positive control over infestation is obtained by rapid and complete destruction of insects in all stages of development, from eggs to adults.

Dried food products are highly susceptible to infestation by insects, and heavy losses are likely to occur unless adequate protection is given during warm weather or when these products are stored in heated buildings. Cold storage below 45 to 50 deg. F. will protect such products against infestation. But when it is impossible or impracticable to cold store, it is necessary to fumigate.

Insect pests against which the QMC must contend in large scale subsistence storage operations at General Depots throughout the country include a number of species of small beetles and moths. The most troublesome are the bean, pea, and flour beetles, and the grain and flour moths.

Once they get into foods that are stored for any length of time, two natural characteristics favor the insects, despite ordinary protective measures:

First, they reproduce at an extremely fast rate. Above 65 deg. F., most pests produce a complete generation of insects in about six weeks.

Second, these pests have a simple breathing system which renders them relatively immune to conditions that prove deadly to animals such as rodents.

Therefore, ordinary vault fumigation or general fumigation of insects at atmospheric pressure requires exposures that are too long for efficient operations. This is especially true in large warehouses where there is a slow turnover of some commodities such as sacked beans and flour. Furthermore, all normal warehouse operations must cease during fumigation.

Vacuum Fumigation Gets the Nod

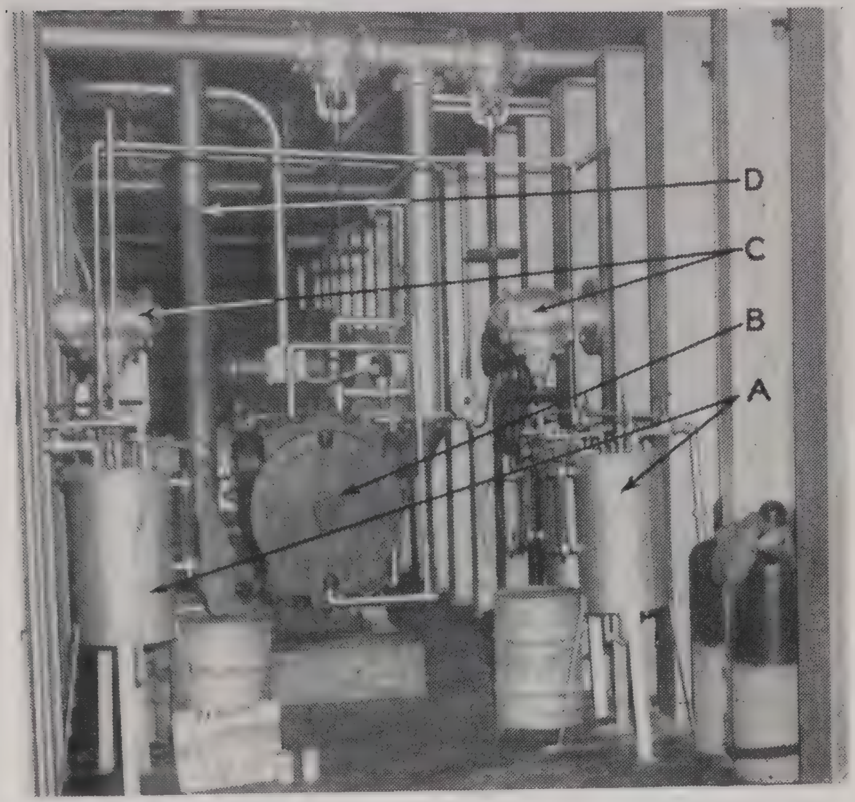
This interference with operations—coupled with the expense incurred through contracting for recleaning and screening of infested commodities, as well as the total loss (less salvage proceeds) of badly infested supplies—recently led QMC to install dual-chamber vacuum fumigation plants in five of its larger General Depots.

One of the first installations was made at the San Antonio General Depot. The chambers were shipped from the manufacturing section of the Jeffersonville Quartermaster Depot and installed by the contractor within an end-section of a steel and concrete subsistence warehouse. At this location, the chambers are easily accessible to other warehouses by concrete ramps for tractor-trailer operation. In addition, the chambers are available for the disinfestation of supplies

. . and cartoned macaroni in other . . .

3 **FORK-LIFT TRUCK** moves two pallet loads of packaged macaroni into Chamber No. 2. In vacuum system, packaging materials do not hinder fumigation.

. . . then these machines start fumigation



4 **OPERATING** equipment is between two chambers. (A) indicates gas volatilizers, (B) vacuum pump, (C) vacuum-breaker valves, and (D) gas discharge pipe.

as soon as they are unloaded from freight cars and before they are put in storage.

The San Antonio chambers are the newer rectangular type. They are 50 ft. long, 6 ft. wide, and 8 ft. high, and they are especially designed for tractor-trailer and forklift truck operations. Indicative of high capacity is the fact that each chamber will take 270 palletized sacks (27,000 lb.) of flour.

In operation, pallet loads are placed on trailers, which are towed into the chamber. Next, the tractor is unhooked and driven out of the chamber, and the doors are closed. A vacuum is then drawn to the desired point, and lethal gas—usually methyl bromide or Acrylon—is bled into the chamber through multiple inlets.

After the commodity has been exposed for the required time, the gas is exhausted and the chamber is flushed with fresh air. The doors are then opened, and the trailers are towed out through the door at the opposite end of the chamber.

High Vacuum Gives Complete Kill

In view of the high vacuum used (27 or 28 in. of mercury), it is unnecessary to remove items such as packaged cereal or macaroni from the package or bale in order to obtain a 100 percent kill. Effective penetration is achieved through a standard multiwall paper or cardboard bag. During fumigation, a temperature of at least 75 F. (preferably higher) is maintained, because susceptibility of insects to gases increases as the temperature rises.

The dual-chamber plant is favored. This type has been installed by QMC. And it is also used commercially, such as in a large North Carolina tobacco plant, where a two-tank vacuum-fumigation unit handles 43,000 lb. of tobacco per fumigation.

By employing dual chambers, crews may be kept busy continuously. One chamber may be loaded or unloaded, while the other is under fumigation. Or both chambers can be under fumigation simultaneously, using one set of operating equipment (see Photo 4).

Two Fumigants Found Effective

Experience at the San Antonio General Depot proved the effectiveness of the two fumigants, methyl bromide and Acrylon. Others have not been used, although the equipment of each 69-ton chamber includes two gas volatilizers—one using the aforesaid methyl bromide or Acrylon and the other for hydrocyanic acid. The latter gas probably will not be used, because of the greatly increased hazards attending its handling and storing.

Compressed to a liquid, methyl bromide can be obtained in 1-lb. cans or cylinders containing up to 150 lb. The natural pressure of the resultant gas at room temperature is sufficient so that cylinders and cans, if in good condition, are self-emptying. Complete volatilization is assured by passing the liquid through an immersion heater-type volatilizer.

Methyl bromide's remarkable penetrating powers make it one of the most efficient fumigants for the treatment of bagged commodities. In addition, it is highly toxic to insects in all stages of development, including eggs. And it is cheap.

In addition, methyl bromide is nonflammable at ordinary concentrations. and it can be used successfully at comparatively low temperatures. However, it is not recommended for fumigating foodstuffs with high fat contents, since these products retain amounts of bromides that may be harmful.

Fumigant Dosages Recommended

Acrylon, a mixture of carbon tetrachloride and acrylo-nitrile, is used interchangeably with methyl bromide at a slightly higher dosage. For example, recommendations covering a standard 3-hr. exposure for the 2,400-cu.ft. San Antonio chambers specify 5 lb. of methyl bromide to 6 lb. of Acrylon (3½ and 4 lb., respectively, for a 15-hr. overnight exposure) for seeds and grains, which include dried beans and peas, rice, and coffee.

The same dosages also are recommended for flour and fine-ground cereals such as wheat cereal, cornmeal, hominy grits, dry breakfast cereal, cracker meal, rolled oats, and general products (macaroni, noodles, tapioca, and cookies). Only in the case of dried fruits does the recommended methyl bromide dosage exceed that of Acrylon the recommendation in this instance being 5 lb. to 3 of Acrylon.

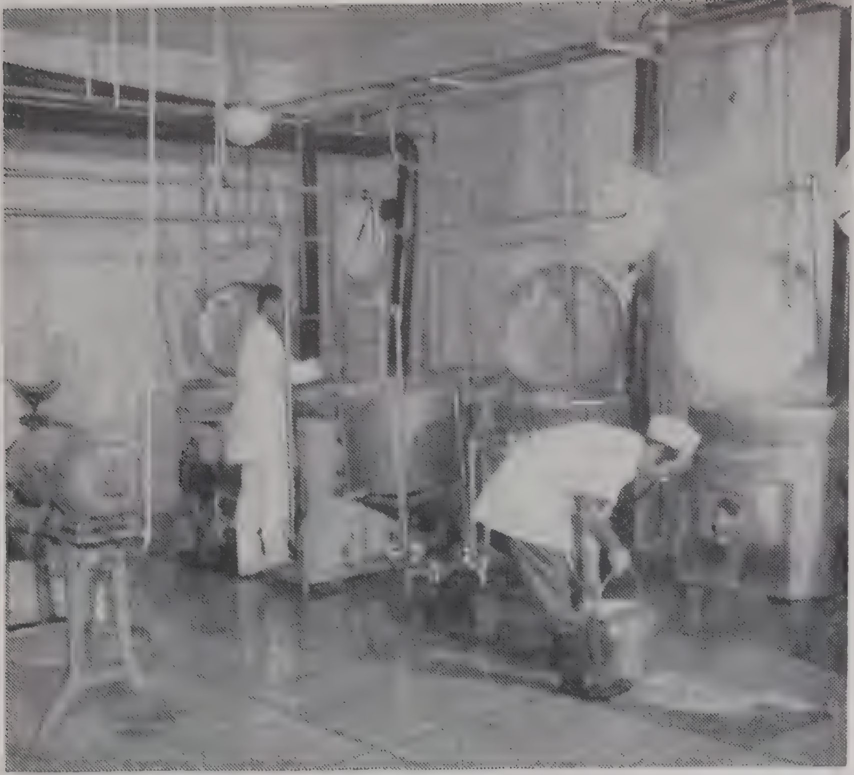
Sixteen man-hours per day is expended in the actual operation of the chambers. This time does not include labor for loading and unloading operations. While the chambers are under vacuum, operators spray box cars prior to loading, and they also treat

(Turn to page 182)

Cooked-Frozen Soup By Aseptic Process

Semi-closed system, employed by Western maker of split pea soup, assures quality product while minimizing the possibilities of contamination

C. R. HAVIGHORST
Associate Editor, "Food Industries"



1 **KETTLE** lineup, with holding tank in center. Unit in left foreground grinds carrots, onions and celery.

2 **COOKING TIME** for each batch is set on clock-face (top). Operator frequently stirs and tests soup.

3 **FINISHED SOUP** goes in packages with crimp-sealed inner bags. Cartons go on mobile racks to freezer. Stainless-steel pipe (top) supplies soup to filling hopper.

For preparation of a cooked food destined for subsequent freezing, the ideal process would be one that maintains an aseptic condition of the product throughout the entire operation. Thereafter, these cooked-frozen foods, like other kinds of frozen foods, would rely on adequate and efficient low temperature conditions in storage and shipment to maintain their condition of quality for ultimate consumers.

The semi-closed system used to produce green split pea soup at Andersen's Foods, Inc., Buellton, Calif., attains a high degree of asepsis. The temperature in the jacketed kettle is 240 deg. F., and the product is cooked at 212 deg. F., cooled to approximately 110 deg. F., packaged and frozen all within a relatively short period of time, and most of this procedure is accomplished in a closed system of stainless steel equipment and piping (see flow diagram).

Thereafter, rapid handling of the product through the danger zone—that period in the process where temperatures ranging down from 100 to 50 deg. F. make such cooked products ideal culture media—reduces the possibility of bacterial contamination.

The fact that, in this process, time as well as temperatures play an important part in asepsis and final quality of this product makes it necessary to detail the chronological as well as unit operation of the processing system.

Carefully Timed Process

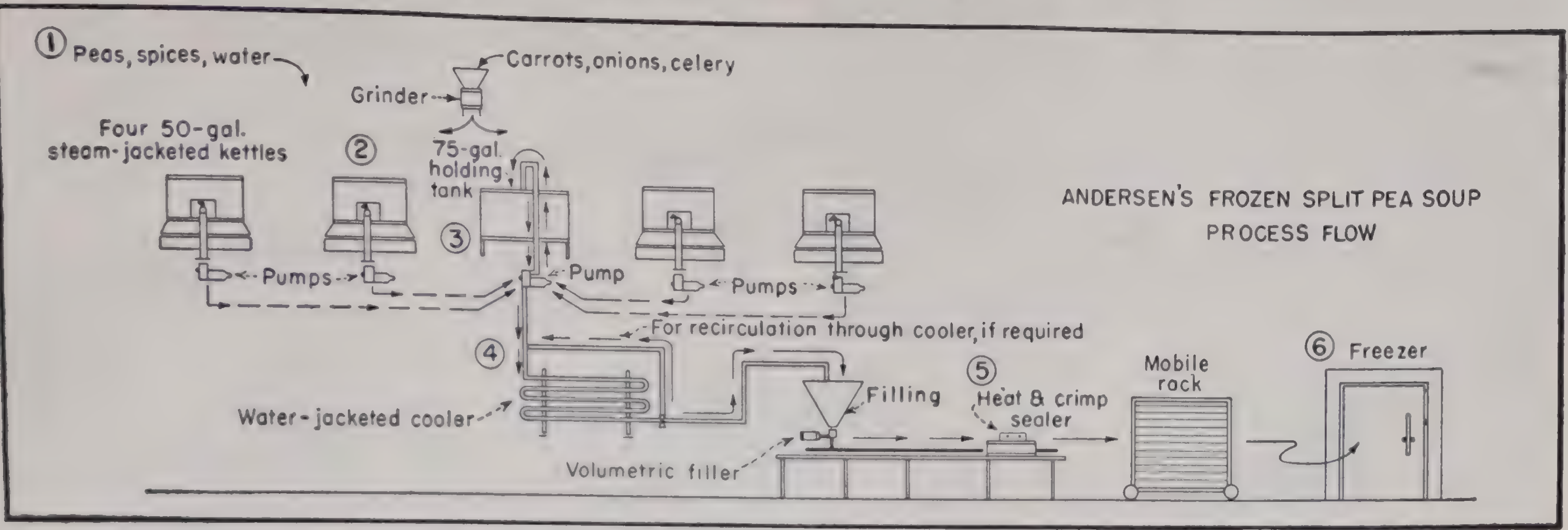
At 6 a.m., the cook-room operator prepares three batches and starts them cooking in the kettles. A short time later he prepares the fourth batch in the remaining kettle. At 8 a.m., when the rest of the crew arrives, the first of these three batches has been cooled; the second, held in the holding-tank, is ready for cooling; and the third is cooked and ready to be pumped to the holding-tank (Photo 1). The fourth batch will be cooked and ready to move through the lines following the first three.

Then at alternate intervals during the day, one batch will be moving rapidly from the filler into cartons, another will be cooling, still another will be in the holding-tank and others will be in various stages of cooking. This cooking system provides a continuous flow of product to the packaging department.

It requires 1 hour and 40 minutes to complete each batch and prepare the kettle for the next cook (Photo 2). The breakdown is: 1 hour for cooking time, 10 minutes to empty the kettle, 10 minutes to clean and then refill the kettle with hot water, and 20 minutes to boil the water.

The formula for a single batch of soup calls for 100 lb. of U. S. No. 1 green split peas, 30 gal. of hot water, fresh chopped carrots, onions and celery, and thyme, cayenne and bay leaves. Spices are measured into containers and bay leaves put into coarse cloth bags previous to the day's

SOUP-MAKING SEQUENCE: Draftsman's flow-diagram of the process . . .


① Peas, spices, water
Carrots, onions, celery
Grinder
Four 50-gal. steam-jacketed kettles
②
75-gal. holding tank
③
Pumps
Pump
Pumps
For recirculation through cooler, if required
④
Water-jacketed cooler
Filling
⑤ Heat & crimp sealer
Volumetric filler
Mobile rack
⑥ Freezer
ANDERSEN'S FROZEN SPLIT PEA SOUP PROCESS FLOW

MIX AND COOK (1, 2) are followed by holding (3), cooling (4), filling and sealing (5), and freezing operation (6)

operation, eliminating the time required for weighing-out these ingredients during the processing operation. Water is first passed through a water-softener, a precaution necessary in making pea soup of high quality.

When the soup is done, it is pumped from the kettles into the intermediate holding tank. At this time, the product is at approximately 200 deg. F. It is then pumped into the water-cooler and its temperature is reduced to about 110 deg. F., after which it goes to the filler-hopper.

How It's Packaged

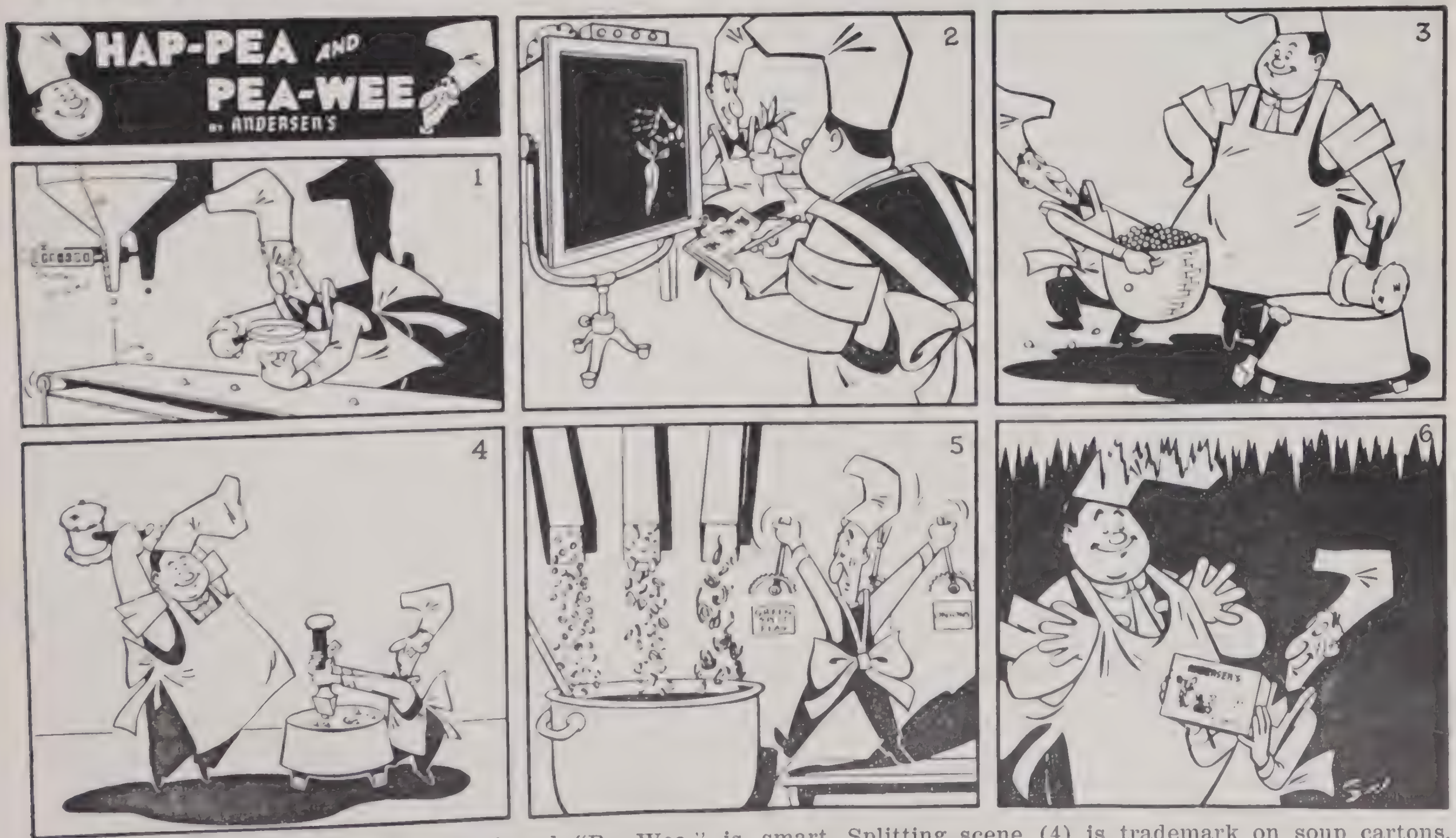
Six operators make up the cellulose bag-and-carton combination. They slip the cellulose bags over conventional wood-shapers, and then the cartons over the bags. They then withdraw the combined packages from the shapers.

The automatic, volumetric filler measures 1 pint of soup into the combined carton, which is positioned beneath the filler by an operator (Photo 3). The carton then moves on a conveyor to the crimp-sealer, where another operator arranges the mouth of each bag and then guides the carton into the sealer to effect a perfect seal. The same conveyor then carries the carton to a final operator who inspects the sealed bag, then closes the carton-top, and places the completed carton on the mobile rack.

At the end of each shift, all pipes and pumps are disassembled and washed in a bacterial disinfectant. The remainder of the equipment is cleaned with hot water, brushes and a detergent. Cooking kettles are given a final cleaning with water, brush, detergent and steel wool. Floors are washed free of spillage several times during the day, and there is a thorough cleaning each night.

The formula for this frozen, split pea soup was originated by Anton Andersen, who at one time was maitre d'hotel for such renowned hostelries as Sherry's of New York and Los Angeles Biltmore Hotel. His son, R. T. "Pea-Soup" Andersen, developed the freezing process.

. . . and adman's whimsical version used for consumer appeal


HAP-PEA AND PEA-WEE BY ANDERSEN'S
1
2
3
4
5
6
ANDERSEN'S

SALES promotion, starring "Hap-Pea" and "Pee-Wea," is smart. Splitting scene (4) is trademark on soup cartons.

Sunkist
ESCONDIDO LEMON ASSN.

CHICAGO BOUND from California, one of the tractor-trailers "toes starting line" on its long citrus haul to eastern markets. This particular unit is carrying lemons packed by Escondido Lemon Assn., in San Diego County.

Long-Haul Citrus Trucking Tested—But There's a "But"

For though California-to-Chicago shipments take less time than by rail, the low costs reflected in trials are still open to question

SEEKING a means to get their transport costs down below the present rail charges on loads of citrus fruits from California and Arizona to the Chicago market, shippers affiliated with the California Fruit Growers Exchange made their first truck experiment in June and up to the middle of July, a total of 15 such truck shipments had been completed. All were made at a lower cost and in less time than by rail.

It is the distance of 2,000 to 2,200 miles that makes the new runs exceptional. Automotive shipments of citrus fruits on shorter routes are not new. In fact, according to figures of the Exchange, 46 percent of this season's 1948-1949 Florida citrus fruit crop was hauled to market by truck, as compared with 27 percent in 1947-1948. The 1948-1949 truck volume of 46 percent was equivalent to more than 42,000 rail carloads.

Similarly, much of the Texas citrus—between 45 and 50 percent of 1948 fruit—has moved to market by truck.

But because of the extremely long haul and the very few established common carrier truck lines, the railroads hitherto have dominated the transportation of citrus fruits from the far west to the Chicago market.

In 1948, a total of 105,829 standard railroad freight cars of oranges, lemons and grapefruit were shipped from California and Arizona to eastern markets. Of this total, 75 percent was shipped by the California Fruit Growers Exchange, a cooperative marketing organization that has been in constant operation since 1893. The citrus fruit produced by 15,000 California and Arizona growers is handled by the Exchange.

Two hundred local packing associations, south to the Mexican border and as far as 200 miles north of San Francisco, are also affiliated with the Exchange. The well-known quality trademark "Sunkist" has been used by the Exchange since 1908 on the first-grade fruit it markets.

In summing up the facts, then, a great potential volume exists for future truck distribution, provided the experimental truck shipments handled by the Exchange prove to be economically sound.

See Two Prime Advantages

The truck shipments have two important advantages over rail. Less time is involved in transit, and the cost per cwt. is lower. There is little if any doubt that the time-in-transit advantage of the trucks can be maintained indefinitely. But the advantage of lower cost is an entirely different matter.

The first experimental truck runs were made by contract carriers booked through brokers in Los Angeles rather than by an established truck common carrier.

It may be noted that one of the latter carriers, Pacific Intermountain Express, schedules a time-in-transit from Los Angeles terminal to Chicago terminal of 5½ days, with a guaranteed sixth morning delivery. By comparison, the first contract carrier runs, from the plants of the shippers direct to the auction rooms of the Exchange in Chicago, were set up on elapsed time of 4 days with delivery on the fifth morning.

The 96-hour running time for 2,200 miles gives an average road speed of 23 miles per hour, which is within present good operating experience. Of course, the time of Chicago arrival is important, since if the load does not arrive in time to be made ready for the daily 9 a.m. auction, it has to be held over until next day.

Rail time-in-transit for citrus fruits sent from Los Angeles to Chicago is 6 days with seventh morning delivery. Thus the trucks have two days advantage in delivery if the current contract haulers fifth-morning delivery can be maintained, or at least a one day advantage if operating delays are encountered necessitating a sixth morning delivery such as guaranteed by the truck common carrier on terminal-to-terminal delivery.

The rail shipment requires re-icing in transport. And of course the contract truck haulers provide a refrigeration service equal to that of the railroads. Ice bunkers similar to those on railroad cars are used on some of the truck units. The great majority however, use trailer mechanical refrigeration.

Rates Compared

The current railroad carload rate is $1.70 per cwt. between California and Chicago for citrus fruits, with a minimum of 35,200 lb. for lemons and 39,200 lb. for oranges. The base rate of $1.70 is before additional icing charges and the current 3 percent transportation tax.

The base rate charged by the contract haulers on the first experimental runs was $1.45, or 15c. per cwt. less than the rail rate. Based on a truck load of 400 boxes of oranges at 85 lb. each, to give a total load of 34,000 lb., the billing at $1.45 per cwt. totaled $493.00 before icing charges of $102.35, to make a total billing before tax of $595.35. At this rate, the cost per box delivered was $1.50.

Although the 34,000-lb. truck load is 5,200 lb. less than the 39,200-lb. minimum shipment by rail, the comparative rail cost on the 34,000 lb., based on the $1.70 rate plus equivalent icing charges of $100.00, would have totaled $678.00.

These figures show a reduced cost by truck over rail of 20c. per box. There is no doubt about the truck costs, because the bills of lading were verified.

Notwithstanding the definite truck savings on the first experimental truck runs, there is considerable doubt that continued runs will be able to make any immediate dent in the current totals of railroad cars of citrus fruit shipped out of California and Arizona, such as the 105,829 cars that rolled in 1948. For one thing there are not enough contract haulers to do the work. Then, too, it is probable that the $1.45 truck rate is below actual cost. Still another factor is the necessity for scaling all truck loads down to 29,000 lb. required for transport over Illinois roads to reach Chicago.

Some indication that the $1.45 truck rate may be less than cost may be had from the Pacific Intermountain Express citrus truckload class rate of $5.94 per cwt. between Los Angeles and Chicago, with a minimum of 12,000 lb. While the P.I.E. rate is a class rate and may show the necessity for a substantially lower commodity rate, the great discrepancy between the two rates of $5.94 and $1.45 for the same product between the same points bears evidence that if one is too high, the other is too low.

Wanted—Willing Contract Haulers

Returning to that Illinois matter, the fact remains that no 39,000-lb.-payload vehicle legally operated west of Kansas City will, under present rulings, be okayed to run over Illinois roads to reach Chicago, unless it drops off 10,000 lb. of its load to make the maximum payload 29,000 lb. At 85 lb. to the box of oranges, that means a maximum load of 340 boxes of oranges, or 330 boxes of lemons at 87 lb. per box, both substantially less than the loads carried on the first experimental truck runs.

Accordingly, the Exchange's chances to effect any permanent savings on the shipments of its members to Chicago by truck instead of rail appear to depend upon its ability to find a continuing number of willing contract haulers—that is, willing to haul at the $1.45 rate with 39,000 lb. loads to Kansas City, and then drop to 10,000 lb. at that breakpoint and run 29,000 lb. maximum loads on to Chicago.

But it must be remembered that common carrier trucking outfits, like P.I.E., can still beat those rail deliveries by one day. And these truckers have a long history of overcoming such problems as those encountered here.

MANAGERS AND SUPERVISORS were on hand for loading of first truck on June 8, when California Fruit Exchange initiated long-haul shipments.

BUSINESS END of big trailer illustrates one of the problems. Load here is 39,000 lb.—which is 10,000 lb. over the Illinois load limit.

Beer-Pool Facility Combines Store,

This Hamilton, Ontario, outlet is typical retail store-warehouse combination. Note separate entrance provided for return of empty bottles (arrow)

Pooled Selling Cuts Distributing Costs

Twenty-one brewers serve Ontario through non-profit organization. They save money on sales and delivery, and bottle returns approach 100 percent

JAMES MONTAGNES
Toronto, Canada

Through the practice of pooled selling, a lot of money is being saved by 21 brewers who distribute beer in Canada's most populous province, Ontario. Notably, the "one-for-all" sales operation effects economies in distribution, bottles, bookkeeping, and actual selling to individual consumers, hotels and taverns.

The special arrangement was dictated by the vast area of the province—extending from the state of New York to Minnesota—that made individual distribution economically difficult for the breweries.

Brewers Warehousing Co. Ltd., the operating organization of the pool, was set up as a non-profit concern to distribute and sell the products of the 21 participating brewers. All of these brewers are shareholders with a direct vote in its operation. The company also acts as a collection agency for the Ontario Liquor Control Board, taking in the license fees from brewers selling beer in the province.

Brewers Warehousing has 153 retail stores serving a total of 103 Ontario communities. Of these stores, 97 are combination consumer and wholesale outlets selling across the counter, or by telephone, on a strict C.O.D. basis. Of the remaining 56 stores, 6 serve as distributing warehouses, and 50 as purely consumer retail stores. In addition, each brewer is allowed by law to have one retail store on the brewery premises.

Brewers' Cost Based on Sales

Operations of the company are paid for by a service charge to the brewers. Based on sales in each store and collected on a monthly basis, this service charge takes into account all operating expenses, including depreciation on buildings and equipment installed in the stores.

Beer is shipped directly to the stores as demand indicates. Truck, rail, or water transport are used. Brewers from outside Ontario usually ship to the distributing warehouses in large volume.

Records of all shipments are made in triplicate. The original is retained by the brewer, the second copy goes to the store or warehouse, and the third copy is sent to the Liquor Control Board. The copy received by the store is later forwarded to the Control Board, where it is checked in with the one received from the brewer to arrive at a control of all beer shipped into the province.

Beer is shipped to the warehouses and stores on consignment. No separate charge is made for bottles sold at retail or to wholesale consumers. The price of the product includes the bottle cost. However, retail stores and warehouses buy back these bottles at current prices, and they are then resold to the brewers, with each receiving approximately the same number of bottles as were sold in each individual store or distributing center. No canned beer is being sold in the province of Ontario at the present time.

Reduces Bottle Losses

Breakages and bottles not returned represented only 3.5 percent of sales during the past year. Thus returns accounted for 96.5 percent of the bottles sold by Brewers Warehousing Co.

A close record is kept by each distributing unit, showing sales of each brand and also the number of bottles returned to each brewer. All bottles are

Warehouse, and Delivery Service

and how refrigerated warehouse is incorporated at rear. A rail spur, on opposite side, permits receipt of carload shipments from breweries.

standard—green for ale, white for lager. Paper labels are used by all brewers. These are removed in the washing machines at the brewery.

Through bookkeeping on sales and on returns of empty bottles, the head-office of the distributing company has been able to arrive at figures showing how many times a bottle is re-used. While the company has no records on new-bottle purchases of individual brewers, sales figures furnish a close estimate. Brewers Warehousing figures that each beer bottle is used seven or eight times before being discarded. These records also suggest that the main amount of bottle breakages occurs with new bottles, and that bottles which have been used at least once will have passed the crucial tests and should be good for at least seven trips from the brewery to the consumer.

Empty Cartons Returned

Incidentally, an attempt is also made to use the brewer's own cartons in shipping empty bottles back to him, since some brewers use carton sides for advertising, and re-use of cartons that are still in good shape effects a considerable saving. Complete records are not available, however, to show how many times a carton may be re-used.

Simplified Bookkeeping

With 153 retail stores and 6 warehouses, bookkeeping on all transactions could be quite a complicated problem. It has been kept as simple as possible, however. An internal audit department at the Toronto head-office has complete control. In addition, a staff of six traveling accountants makes an audit of each store four times a year. An independent firm makes a yearly audit of the entire Brewers Warehousing operations, and test-checks the retail stores.

Data is Confidential

In order to have a complete picture of the operation, a series of reports is submitted by each store and each group of stores. (Of the 153 retail stores, 67 are main stores, some with one or more subsidiary stores. The subsidiary outlets are commonly found in the large cities, where a local main store is responsible to the head-office for all sales in the community.) From these reports each brewer is informed of his sales in each store four times a month.

These reports are confidential and deal with each brewer's own sales in each store or warehouse. Total sales for each store or warehouse are also included. From the individual reports he can calculate his percentage of total sales, but he does not obtain sales figures of competing brands. (This system of sales reporting appears to be unique, even in Canada.)

Reports to the brewers show the amount of stock on hand at the end of each period. The brewers can check these reports against their own records and against the triplicate invoices sent to the store or warehouse with each load. In addition, company auditors, on their visits to each store four times a year, report to the brewers the amount of stock they count on their inspections.

Weekly reports show not only the stock on hand, but also the sales, the amount of commission deducted for service costs, and the net remittance due the brewer. Each of the 67 main stores remits by certified check direct to each brewer, the amounts shown on these reports.

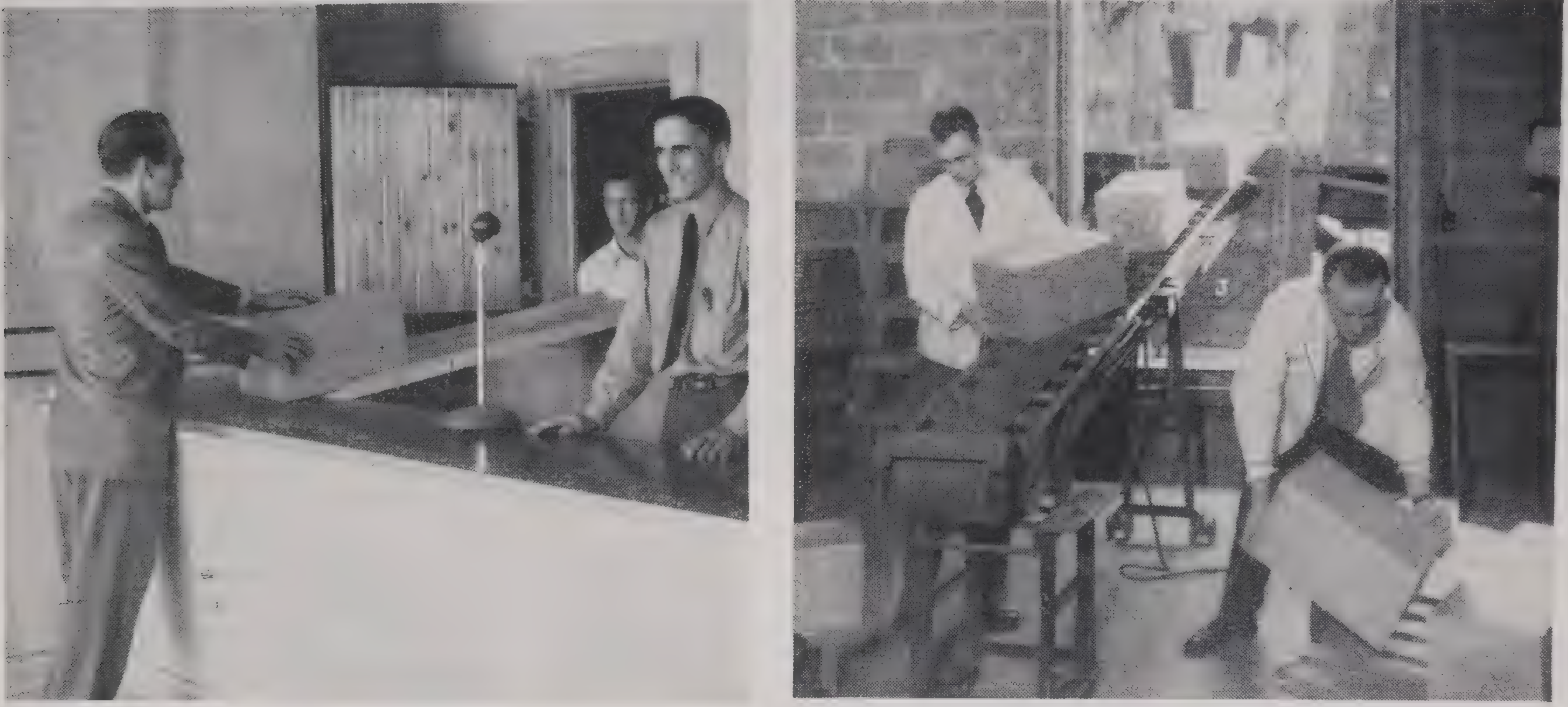
Reports to Head-Office

Monthly reports of sales are also made to the Brewers Warehousing head-office statistical department. These are in a "recap" form showing the packages sold or distributed, the sales value, and the gallonage. A report is also made of the number of empty containers returned to the brewers from each store, and the percentage to the sales, as well as the number and values of deliveries.

Each store sends to the head-office a financial statement once each month. It consists of a balance sheet and a statement of revenue and expenses, giving full operating revenue and store costs.

All of the distributing company's warehouses and retail stores throughout Ontario are built on its own plans, which must be approved by the Ontario Liquor Control Board. Similarly, all building locations must first be approved in respect to local regulations and by-laws. There are local-option dry areas throughout the province.

Modern, glass-front stores (this one is in Ottawa) feature . . .



. . . quick service to customer from the cold room, where conveyors speed handling

Stores built within the past year have all been of modernistic design, with as great use of window space as possible to allow full view of the entire store from the street. It is to be noted that no advertising of beer is allowed in Ontario, and no bottled beer may be shown in the stores. Only boards listing beers, brands, and prices and showing labels may be displayed in the stores.

Store Interiors Dignified

Interiors of these outlets have changed in the past few years—from the bare utilitarian counter with painted walls to a more dignified appearance through use of paneled walls, tiled floors, and modernistic-type veneer-finished counters.

A standard system of billing is used in all the stores, and also standard procedure for the customer to order refrigerated beer, pay for it, and finally receive it directly from the stockroom wicket.

Hold Beer at Low Temperatures

All retail stores also have a separate, adjoining entrance where customers can bring empty bottles and be immediately paid for them. Prominently labeled, this entrance is an important factor in the operation of getting back as many empty bottles as possible.

All company stores and warehouses have their own refrigeration units, keeping beer in cartons at 42 deg. F. and beer in kegs at 38 deg. Stores and warehouses try to keep at least a week's supply of beer on hand, and in remoter parts of the province, a minimum of three weeks supply is maintained.

Brewers Warehouse Co. operates its own fleet of trucks—400 vehicles in all, varying from small stake and home delivery trucks, to highway carriers. Most popular is the 3-ton stake-body truck. In some localities, local cartage companies deliver for the company, but in most cases the company operates its own trucks and maintains centralized service and garage facilities in order to keep operating costs to a minimum.

The pooled system of handling beer in Ontario has proved its efficiency in hard cash savings—which have been passed on by the brewers and are thus responsible for keeping the beer price structure normalized in Ontario. All standard brands sell at the same price, with a higher price on premium brands. Standard price of beer in Ontario for a 24-bottle case of 12½-oz. bottles is \$3.75, and of this, 75c. is returned for the empty bottles.

We Think . . .

▪ Management Must Be Informed About Advanced Engineering

We have never known a time when so many in the food field were taking so much interest in advanced food plant engineering. The principal reason is the pressure to cut costs while still improving quality. This brings everyone into the act—management, technologists, engineers, plant operating men, and equipment builders. It also involves educators, who develop technical personnel to carry out advances, and bankers, who make loans for purchasing new plant and equipment.

But management is—or should be—the most interested of all. Upon its shoulders falls the responsibility to reduce costs and improve products as fast as it can find ways and means. Therefore, top executives must initiate advances and encourage their technical men to do likewise. And these executives also must pass intelligent judgment upon the technical man's proposals for—or objections to—important changes.

Executives cannot successfully discharge this responsibility unless they understand at least the fundamental technical advantages and hazards of advanced plant engineering—as well as the economics of it. Nor can they do it if they have a psychological resistance to new ideas.

In many instances, progress must start at the top. In no instance should feasible advancement be blocked, or unsound changes be sanctioned, at the higher executive level. Management is paid to call these shots correctly.

▪ You Should Think Twice About Newfoundland Discoveries

Ordinarily, we discuss a particular development only once, then let it rest in peace among the literature of the industry. But we depart from that procedure here to place what we believe is warranted emphasis upon the highly significant findings of the nutrition studies in Newfoundland. We do this because food processors in general do not keep pace with the nutritionists. That is, they do not take sufficiently keen interest in new nutritional discoveries and are slow to apply these findings to processing operations.

As pointed out by R. M. Wilder, of the Mayo Foundation, in our July issue, studies before and after a four-year enrichment program in isolated Newfoundland conclusively proved two things which are something for the food industry to think about:

First, malnutrition was common in respect to vitamin A, thiamin, riboflavin, niacin and ascorbic acid. This is significant because similar conditions would be found in almost any area of this country where enriched foods were not available. We are so accustomed to thinking of well-fed and healthy Americans that we sometimes forget that—nutritionally speaking—many are ill-fed. And many who appear healthy are suffering harmful dietary deficiencies.

Second, after the population in Newfoundland had eaten enriched foods for four years, a great improvement was noted. Much of the apathy and listlessness previously observed was gone. The reported death rate had fallen. And stillbirths and deaths of infants less than 1 year of age were strikingly reduced.

These discoveries leave little doubt that food processors who enrich their products are rendering an invaluable service to the public. One could hardly imagine a situation where, to paraphrase Churchill, so few could do so much for so many.

▪ Law of Supply and Demand Would Answer Brannan's Prayer

Following defeat of his farm-price support plan in the House of Representatives, Secretary Brannan remarked that he was "still hopeful" of finding some method to cope with the problem of surpluses. If he will look over the fence into the field of business, he will find his answer. It is the age-old economic law of supply and demand.

What happens, for instance, when millers produce too much flour from the farmers' wheat? The amount available to users is more than they will buy, so flour fills the warehouses, the price drops, and millers cut production. And if it develops that there are too many flour mills—as was the case early this year after exports dropped—then a few of the less efficient mills are shut down, and production is cut somewhat in the others. In the end, you have your best mills turning out at lower cost all the flour that is wanted.

This sort of surplus control goes on day after day and year after year in all branches of food processing and other industries. 'Tis a pretty good system. And like the law of gravity, the law of supply and demand always works. True, it puts some people out of business, and it would do the same for farmers. But there always are other areas where supply is less than demand, and human effort can be shifted to these to keep everybody busy. So in the long-run the country has goods produced by the most efficient operators, and it benefits by a decrease in surpluses and an increase in goods and services where there is short supply.

Secretary Brannan also says that farm income is "the key to prosperity." A lot of other people believe that, too. But there are a couple of qualifying conditions. First, no one has ever proved that farm income must be maintained at any given figure to avoid a depression. Second, it can be said of many other large economic groups that their income is essential to prosperity in this country. Certainly, it is vital that manufacturing industries as a whole operate at a high level of activity and satisfactory level of profit if a depression is to be avoided.

But does the government support the income of manufacturers? On the contrary, it seems to be bent on taxing industries to death. Does the government worry when an inefficient manufacturer has to go out of business for lack of markets? It only says "good riddance."

So why upset our whole economy to prevent some farmers from going out of business to reduce surpluses? There are plenty of other jobs which pay a good wage.

It's about time this country got back to fundamentals in its economic thinking. We built a pretty darn good set-up on those fundamentals. We depart from them at our own risk.

■ Gas Processing and Packaging Offer New Opportunities

There currently is a surge of interest in the use of nitrogen to protect food against the deteriorative effects of oxygen, both in processing and in the package. Commercial applications have been made in the processing, handling and packaging of fats and oils. And research indicates advantages in processing such diverse foods as apple juice and milk, and in packaging oil-bearing foods like nuts and potato chips in gas-tight flexible containers. Because of the basic studies being made on nitrogen applications, it is likely that processors will be hearing a lot about the effectiveness of this inert gas in the months ahead.

Unfortunately for economical gas packaging of nuts and potato chips in transparent bags, there seems to be no low-cost film available which will retain the gas. Experimental transparent laminates are being tried, and they may prove satisfactory. But indications are that they will cost four or five times as much as cellophane. This would tend to limit their use to high-price specialty foods. A few metal-foil laminates will retain the gas and will be used where the packer does not insist on a transparent container. Some products, such as powdered milk and yeast, are usually sold in opaque packages, so they present no problem. Here the opaque material has the advantage of excluding light, which catalyzes oxidation.

But you can add to your list of things needed, a low-cost, gas-tight, transparent packaging film. Packaging materials manufacturers please note.

■ Low Sugar Quotas Harm Many for the Benefit of a Few

In its zealousness to help American farmers—who already are faring better relatively than most other groups—the U. S. Department of Agriculture is inclined to forget the most important fundamental concept of a democratic government. We refer to the principle that acts of government should be for the benefit of the greatest number. Never should many be harmed for the unwarranted benefit of a few.

A case in point is the establishment of sugar quotas. These are set under the Sugar Act for the purpose of providing "reasonable protection" to domestic sugar producers. We question the economic soundness of this act, because it prevents the operation of the law of supply and demand. But that is another story. The point we wish to make here is that the act is administered with too much bias. Import quotas are set on the low side, allowing domestic producers a larger share of the sugar market than they can fill. While the quotas may eventually be changed, a temporary shortage and higher prices result.

Such a shortage existed at midyear. This was called to the attention of Secretary Brannan, with a request for quick remedial action by associations in the baking, bottling, ice cream, preserving, desserts, and confectionery industries.

The consumption estimate of the USDA was only 7,250,000 tons for the year. But distribution figures indicated a total requirement of 7,590,000 tons on the normal trend pattern of prewar years. And if you take the 1948 trend pattern, the year's total actual consumption will be about 8,107,000 tons.

Such a discrepancy between consumption estimates and actual requirements should not be permitted to recur.

■ Change in R&MA Indicates Coordination of Agricultural Research

A sound change in policy has been made following the resignation of E. A. Meyer as administrator of the Research & Marketing Act. This administration is now to be handled by Dr. B. V. Cardon, in effect as a part of the program of the Agricultural Research Administration. So we can expect from this outstanding leader a close coordination of the R&MA function with the work of the older agencies which are directed by him through ARA.

During the first two years of work under the Research & Marketing Act, it was inevitable that many novel programs would be started and some mistakes made. The mistakes were not serious, because in general they demonstrated what not to do. But it is now time that such pioneering into marginal areas be more accurately appraised and coordinated with the work of the career bureaus, the State agencies, and the cooperating associations, research laboratories and industry.

Such coordination could not be in better hands than those of "Vince" Cardon. Most of his professional career has been in State, Federal and cooperative programs.

And this shift affords the food processing industries a new opportunity to exert constructive influence.

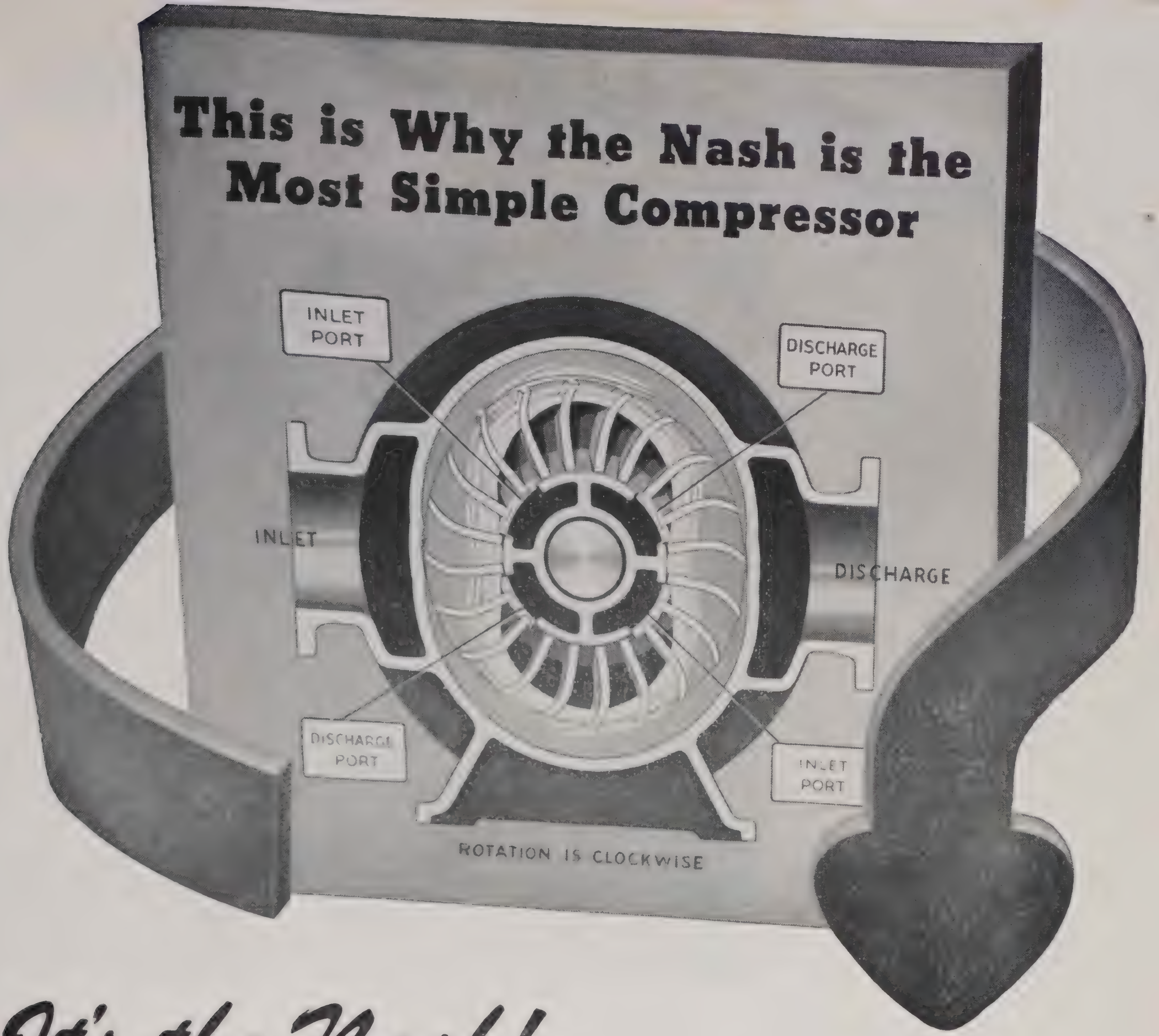
■ Poor Education of Pressure Groups Spells Continuing Trouble

Seemingly, we in the USA are suffering a needless rash of national labor and economic problems by reason of the poor education of some of our labor leaders and certain farm politicians.

Some of them lack a knowledge of industrial economics. Take, for example, the CIO folks who insist that the steel worker's pay can be hiked another 30 cents an hour without a corresponding price rise. From a purely industrial economic viewpoint, this might be theoretically provable on paper—which we doubt, because sales are made by companies not by industries nor by averages.

On the other hand, those who are motivated only by a desire to help the farmer seem to lack a perception of agricultural economics.

The seeming inability of either group to look at the political economy of the whole world bespeaks a lopsided sort of education. This spells nothing but trouble so long as such groups are able to force acceptance of their convictions.



It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

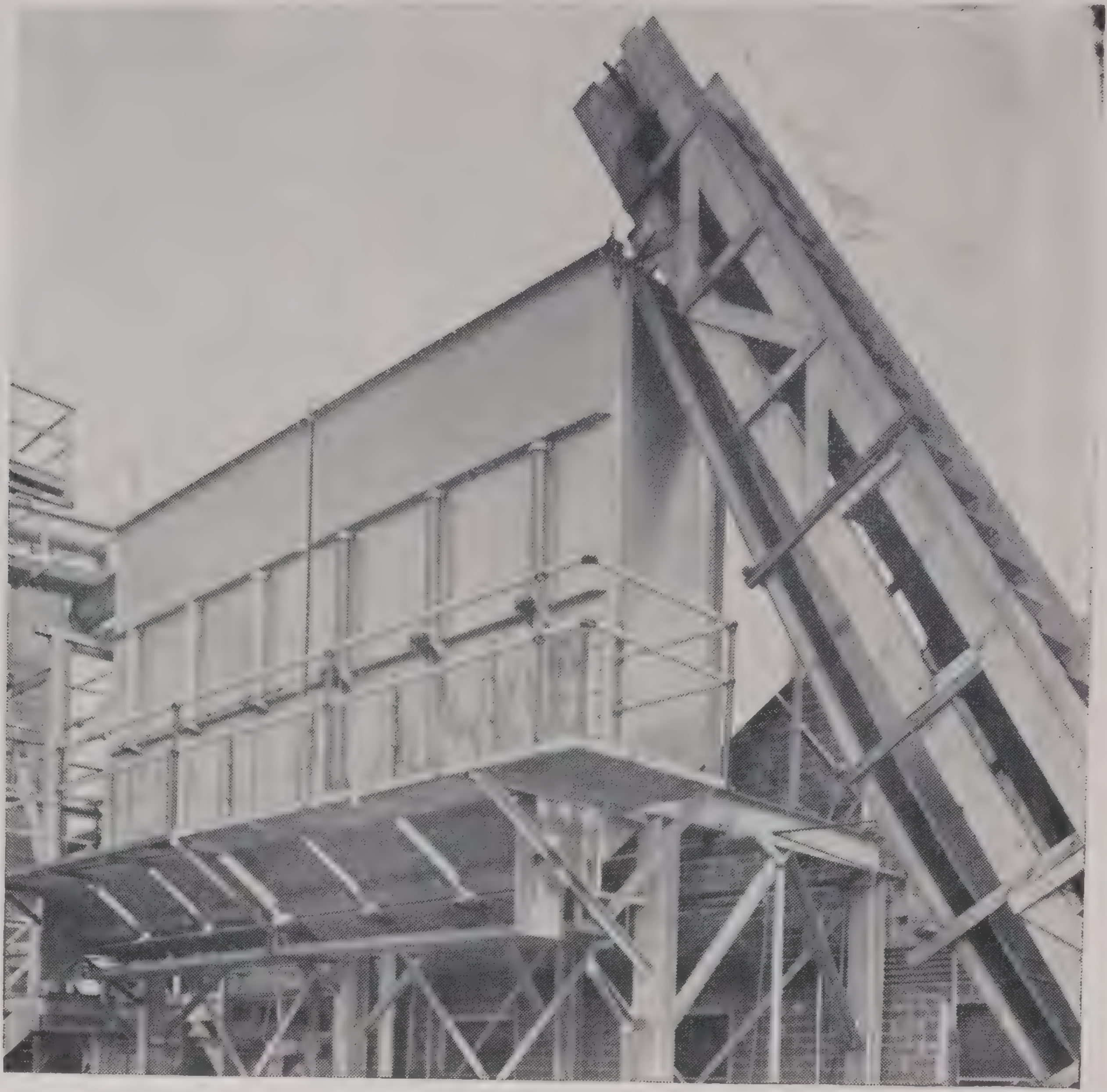
Desired delivery temperature automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY
31 WILSON, SO. NORWALK, CONN.

STAINLESS-CLAD STEEL BINS...



These two 25-ton bins handle discarded citrus peel and pectin process refuse at Bireley's Division, General Foods Corporation, Hollywood, California.

avoid waste in disposing of waste

Waste products aren't held long here, but they're quick to attack ordinary metals. That's why Lukens Stainless-Clad Steel was used in constructing these bins; it is highly resistant to corrosion.

Lukens wide range of clad steels enables you to select a surface meeting conditions all along the line. At one point, Nickel-Clad Steel may be best. At another, Stainless-Clad, Inconel-Clad or Monel-Clad Steel may be the answer. Lukens engineers will help you decide.

These corrosion-resistant claddings, 10% or 20% of total plate thickness, are permanently bonded to steel backing plate. Thus you get *solid* metal protection at the lower cost of *clad* steels. All are available in the easy to clean, extra-smooth sodium hydride finish.

Ask your supplier to quote on equipment offering these economies. Bulletin 449 tells you more about Lukens Clad Steels. For a copy, write Lukens Steel Company, 401 Lukens Building, Coatesville, Pa.

CLAD METAL STEEL

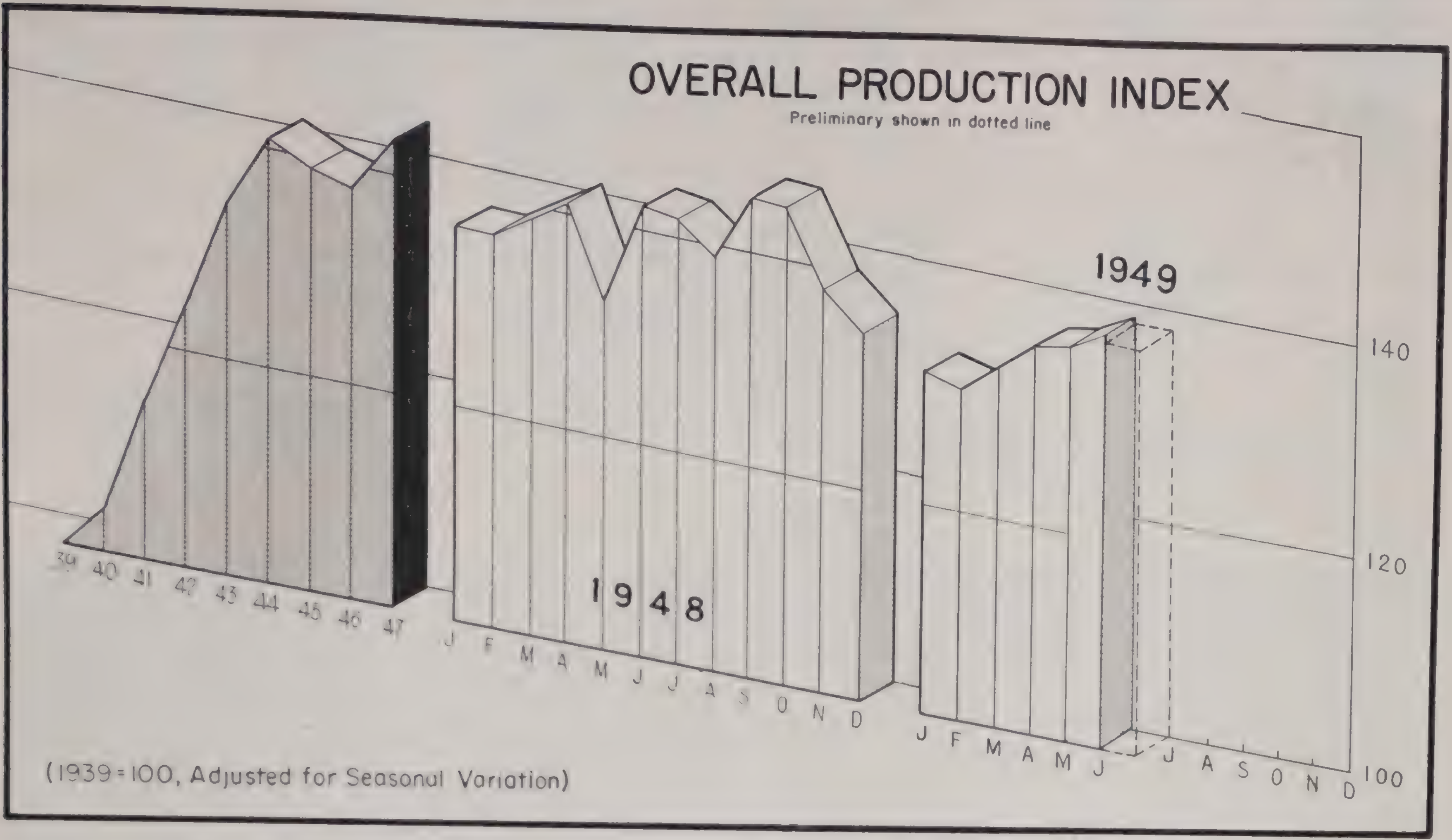
LUKENS

Nickel-Clad Stainless-Clad
Inconel-Clad Monel-Clad

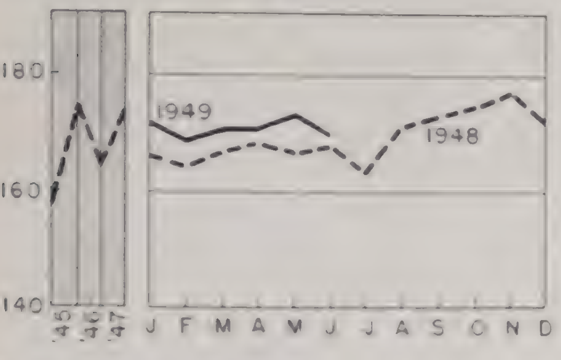
STEELS

SOLID METAL ADVANTAGES WITH CLAD STEEL ECONOMY

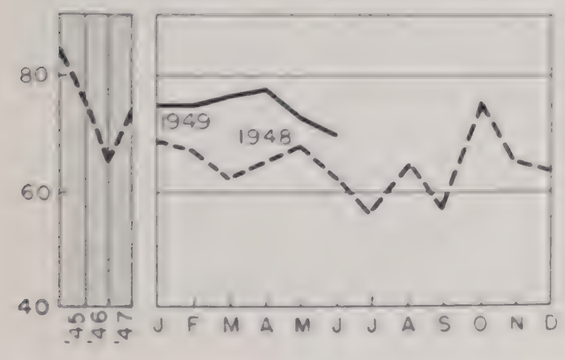
Food Industries Index



Condensed Milk Slips



Butter Keeps Sliding



At a Glance—

(1939 = 100. All Figures Are Adjusted for Seasonal Variations)

	June 1949	May 1949	Percent Change	Year Ago
Baking	146	140	+4	145
Beverages	159	159	..	162
Butter	70	73	−4	63
Canning	141	145	−3	139
Cereals	145	142	+2	150
Condensed Milk	170	173	−2	168
Confectionery .	102	100	+2	117
Flour	124	124	..	136
Ice Cream.....	176	178	−1	177
Malt Liquors..	156	155	+1	172
Margarine	289	267	+8	344
Meat Packing.	144	145	−1	151
Sugar, Beet...	65	62	+5	105
Sugar, Cane...	67	63	+6	75

Output Falls Slightly After Long Climb; Boom in Dairy Production Levels Off

After rising substantially from March through June, the output of the food processing industry slipped one point in July to 137 on the FI Index. This compares with 141 a year ago. But as this issue goes to press, there is a strong feeling of optimism in the industry regarding the outlook for food sales.

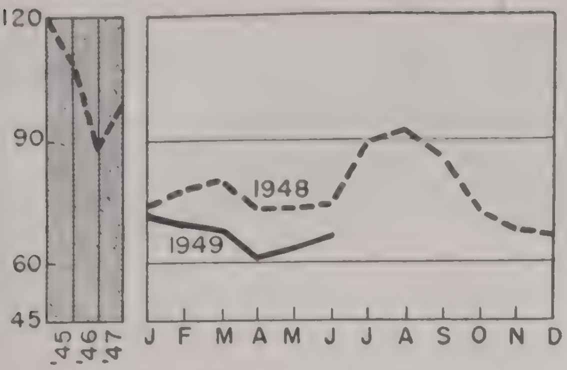
PRODUCTION of condensed milk turned down in June, after running above 1948 output during the first half-year. Butter production also turned down, although it is still ahead of 1948. This marks a leveling out in the high rate of production achieved by the dairy industry in 1949. In the first five months of 1949, the total volume of milk used in dairy products increased by about the same amount as the increase in farm milk production. In other words, manufacturing absorbed all of the extra farm output. More recently, farm milk production has eased off, and so has dairy products manufacturing. Less milk is being used in butter, cheese and condensed milk.

The annual rate of production has apparently declined for all dairy products which are made from whole milk. Creamery butter production fell during June to an annual rate of about 1.3 billion pounds, the lowest since last December; in March and April, the rate of butter production was 1.5 billion pounds. Likewise, the annual rate of production for American cheese has declined from more than a billion pounds in the first several months of the year to under 900 million pounds in June. Output of condensed milk has just begun to slip. Its FI Index dropped to 170 in June after reaching a high for the year of 173 in May.

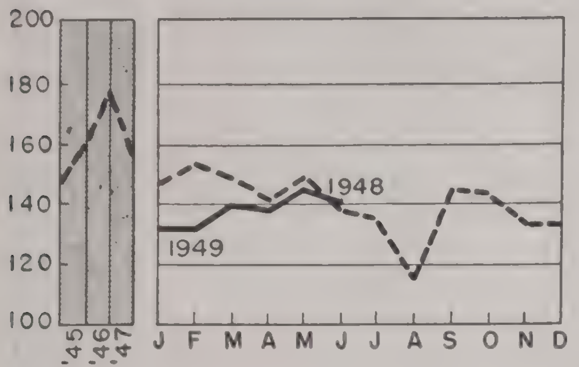
Outlook for Dairy Products

How will dairy production go in the months ahead? There are three factors in the outlook: (1) Consumption, (2) stocks and (3) exports. Consumption has increased in 1949 as retail prices have fallen. The heavier production of butter in particular has responded to a bigger demand from housewives, who found that food much cheaper than in 1948. But other dairy products also are selling at retail prices below last year. Meanwhile, consumer income is running ahead of 1948 figures. So unit sales of all dairy products should remain high, even if

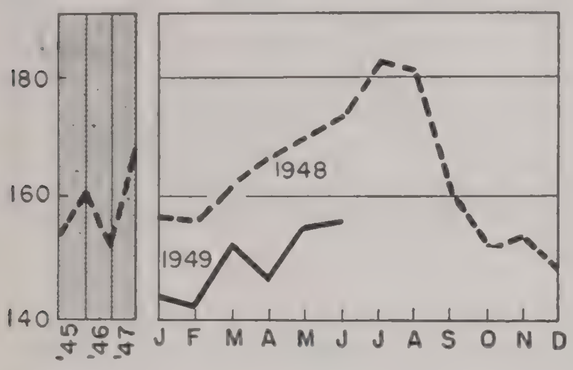
Cane Sugar Up Again



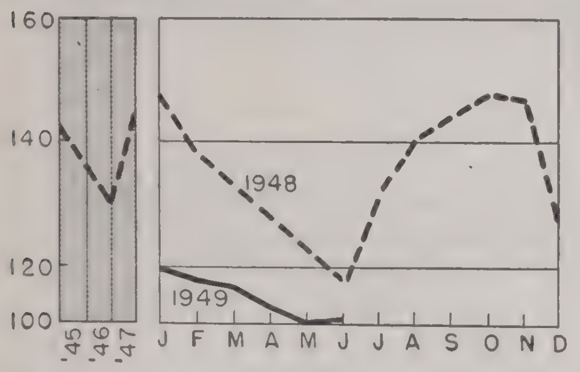
Canning Starts Drop



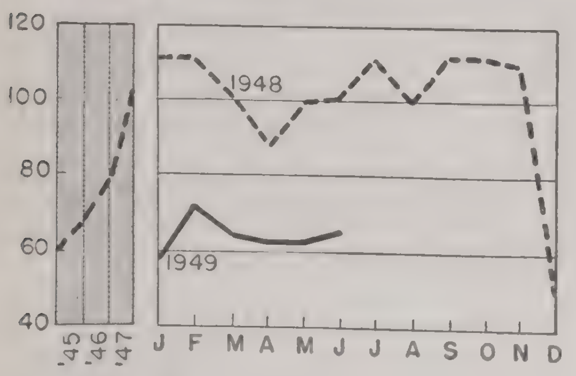
Malt Liquors Still Rising



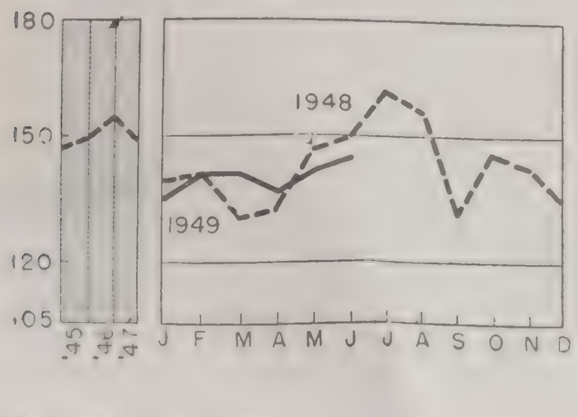
Confectionery Turns Up



Beet Sugar In Upturn



Cereals Still Rising



there is some seasonal rise in prices in the fall.

Stocks of all important dairy products, however, show more than a seasonal increase. The accumulation is not only bigger than last year but considerably above the 1936-40 average, which is the usual measuring stick. On June 1, butter stocks were 25 percent above average and nearly three times the 1948 holdings. Part of this increase consists of government-support purchases. Stocks of cheese were only slightly higher than last year, but were 30 percent above average. Inventories of American cheese were 80 percent above the prewar normal figure. Altogether, inventories of dairy products in June were 40 percent higher than in 1948 and 45 percent above the average for that month.

Storage operators have accumulated stocks because: (1) Prices have been lower than last year, and there is less inventory risk. (2) Higher government support prices have been announced for butter and nonfat dry milk solids.

The government not only has increased its own inventory of butter, but has stimulated private storing. It has given assurance that butter now stored may be sold to the government later at stated support levels. Consequently, it is estimated that butter stocks rose sharply, perhaps doubling, during June. Currently, they are much above last year. But consumption is much higher, and government holdings will not be thrown onto the market.

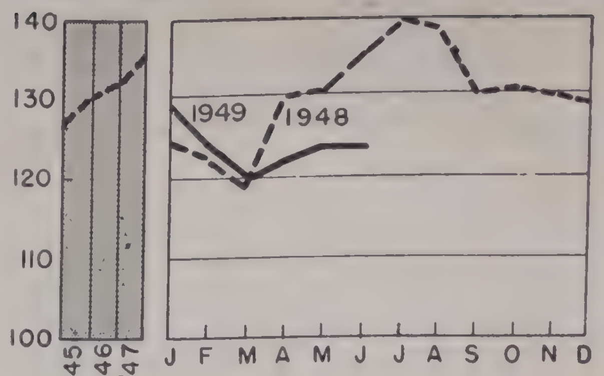
Export Market Weakens

While stocks have built up, the export market has shown signs of weakening. Exports of dairy products, except butter, were larger in the first months of 1949 than in 1948. Recently, some items have slipped below last year. The export market for cheese appears particularly vulnerable because of the dollar crisis in Britain. About two-thirds of 1948 exports went to that country. The British planned to use 20.8 million ECA dollars to buy U. S. butter in the second half of 1949. But these purchases have been suspended.

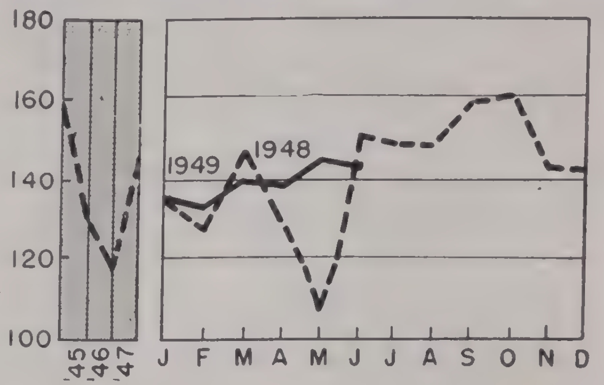
Shift in Buying Indicated

Despite the high level of consumer purchases, the lower demand which is indicated from storage operators and foreign nations seems likely to cause further slackening in total dairy production during the remainder of 1949. The seasonal reduction in output that normally occurs each fall may be sufficient to correct the situation. However, a shift from butter to other products is indicated, unless production is to continue flowing into government stocks via the support program.

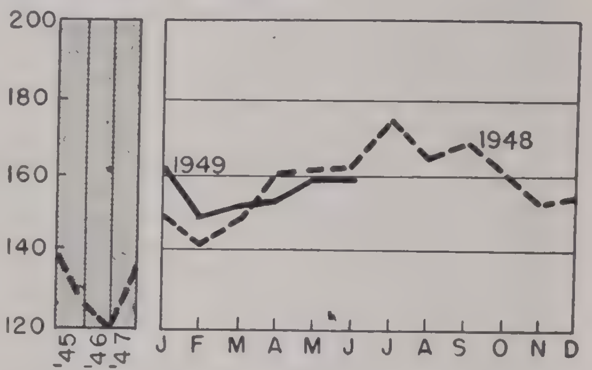
Flour Holds Own



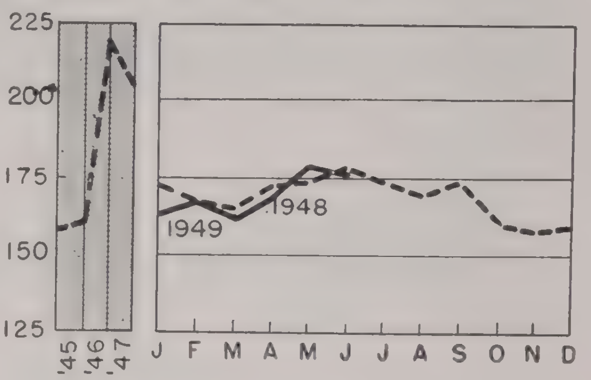
Meat Packing Down Slightly



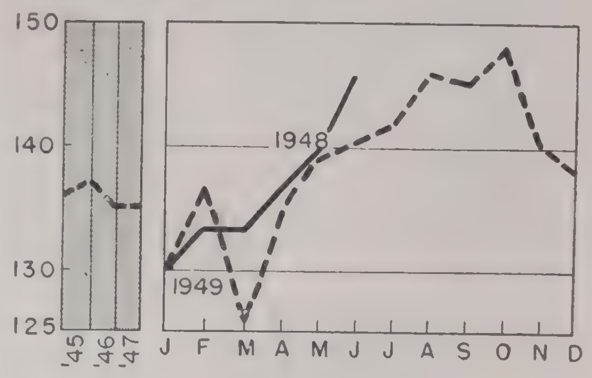
Beverages Level Off



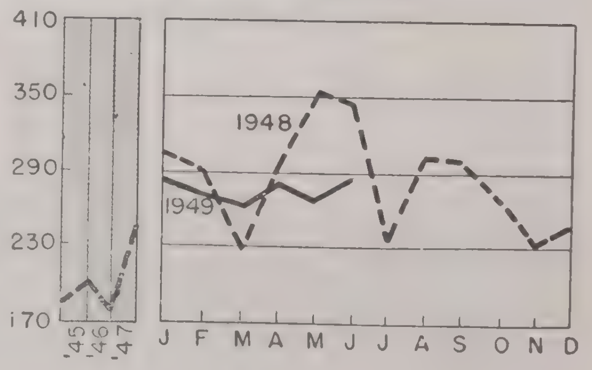
Ice Cream Turns Down



Baking Continues Climb



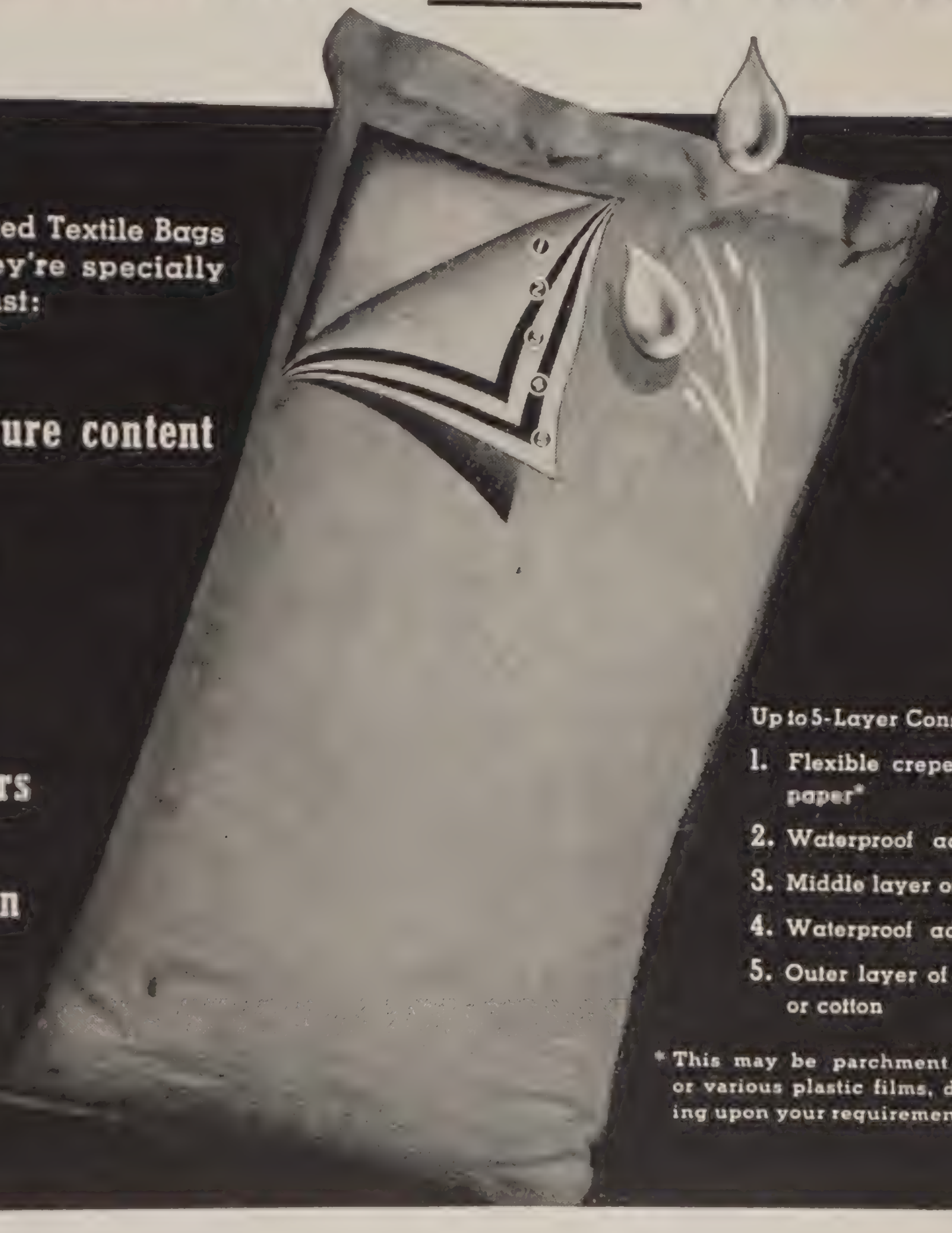
Margarine Reverses Trend



WE CALL 'EM

Waterproof Bags

...BUT...THIS KIND OF PROTECTION IS ONLY ONE OF THEIR FUNCTIONS



Bemis Waterproof Laminated Textile Bags are extra strong, and they're specially constructed to guard against:

- **Change in moisture content**
- **Contamination**
- **Sifting losses**
- **Undesirable odors**
- **Insect infestation**
- **Loss of aroma**

Up to 5-Layer Construction:

1. Flexible creped kraft paper*
2. Waterproof adhesive
3. Middle layer of paper
4. Waterproof adhesive
5. Outer layer of burlap or cotton

* This may be parchment paper, or various plastic films, depending upon your requirements.

If you have a "hard-to-pack" product or one that must stand the rough handling of l.c.l., truck, or export shipment, it will pay you to investigate the advantages of Bemis Waterproof Bags.

BEMIS
Waterproof
BAGS

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"America's No. 1 Bag Maker"

BEMIS BRO. BAG CO., Waterproof Dept.
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Please send complete information about Bemis Waterproof Bags for

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(Product)

Name______________________

Company______________________

Street______________________

City______________ Zone______ State______

1 **THESE** ocean perch have benefited Gloucester's fishing industry. They are caught in large quantities the year 'round. Steady catches enable processors to operate without let-ups and to keep markets supplied.

Packaging and Quick Freezing Fillets

New Production Lines Are Easily Adjustable to Handle Various Unit Packs

FLEXIBILITY is an outstanding feature of the two redesigned fish-freezing lines that General Seafoods recently put into operation at its Gloucester, Mass., plant. The new lines turn in a high performance, freezing hourly over 4,000 consumer-size 1-lb. packages of ocean perch.

Originally, these lines were used to cellophane-wrap fillets of various sizes and pack them in 5-lb. cartons. Now, the line is interchangeable. With slight modifications it can be used for 1- or 5-lb. packages. For example, to change from the 5- to the 1-lb. package, weighing stations and carton wrapping machines for the smaller size are installed in a matter of minutes. Both lines also "double" for cod, haddock, and gray sole.

The filleting and freezing of packaged ocean perch has been a boon to the Gloucester fishing industry since about 1938. Formerly, this fishing port banked heavily on such fish as cod, haddock, pollock, mackerel, and gray sole, which recently have been landed in decreasing numbers.

Until 1932, there was no demand for ocean perch. However, at that time, General Seafoods' Larry Alphen, while seeking other items for the fillet-freezing line, packaged and froze some ocean perch fillets. And in no time at all a market was created.

There are three reasons why these fillets have "gone over big" with the processors: (1) They are caught in large amounts (total landings at Gloucester for 1948 amounted to 176,000,000 lb.), (2) they are fished year 'round so that plant operations are not seasonal and prices can be held fairly even, and (3) the market can be steadily supplied with reasonably priced fish.

Sales got off to a flying start in the midwest. The fish proved popular with the mid-westerners because they have a mild flavor similar to that of the inland water fish to which these people are accustomed. Also, the fillets are small (6 to 10 per lb.) and thus suitable for the popular "fish and chips." Furthermore, the expansion of refrigerated transportation was instrumental in keeping this section of the country supplied with these quality fish.

Referring now to our fold-out flowsheet (right), key-numbered operations show steps in the production of 1-lb. packages of frozen ocean perch fillets.

Fish are unloaded from fishing vessels by electric hoist and canvas baskets, and they go into wooden boxes holding 650 lb. Six boxes are put on each trailer, and a tractor hauls two trailer loads of fish, 1,000 ft. to the plant. Here, a traveling electric hoist removes each box and transports it to a supply hopper—at (2) in the flowsheet. Then, a flight conveyor feeds the fish into a rotary scaler.

Emerging from the scaler, the fish drop into boxes—at (3) in the flowsheet—and a traveling electric hoist carries the boxes of scaled fish to the hopper on the filleting line.

Another flight conveyor—at (4)—takes the fish to a horizontal conveyor that feeds twelve bins. Each bin supplies two workers, who cut about 90 lb. of fillets an hour. Fillets are now conveyed to the inspection line, and gurry (fish waste) goes to the gurry hopper outside the plant.

On the inspection line—at (5)—17 girls trim fillets of bruises, fins, and tails, working at Lucite candling tables. Trimmed fillets are next conveyed to the brining tank, seen at (6). Here, they get a 20-sec. dip in 10-deg. S. brine.

From the brine tank, a conveyor elevates the fillets onto the packing table, where 12 girls weigh them into 1-lb. size cartons, seen at (7).

Finally (8) to (11), cartons are machine-wrapped in wax paper and heat-sealed. Trays of cartons are put in racks that are then hauled to multi-plate freezers. After the fillets are frozen, they are cased and held at 0-deg.-F.

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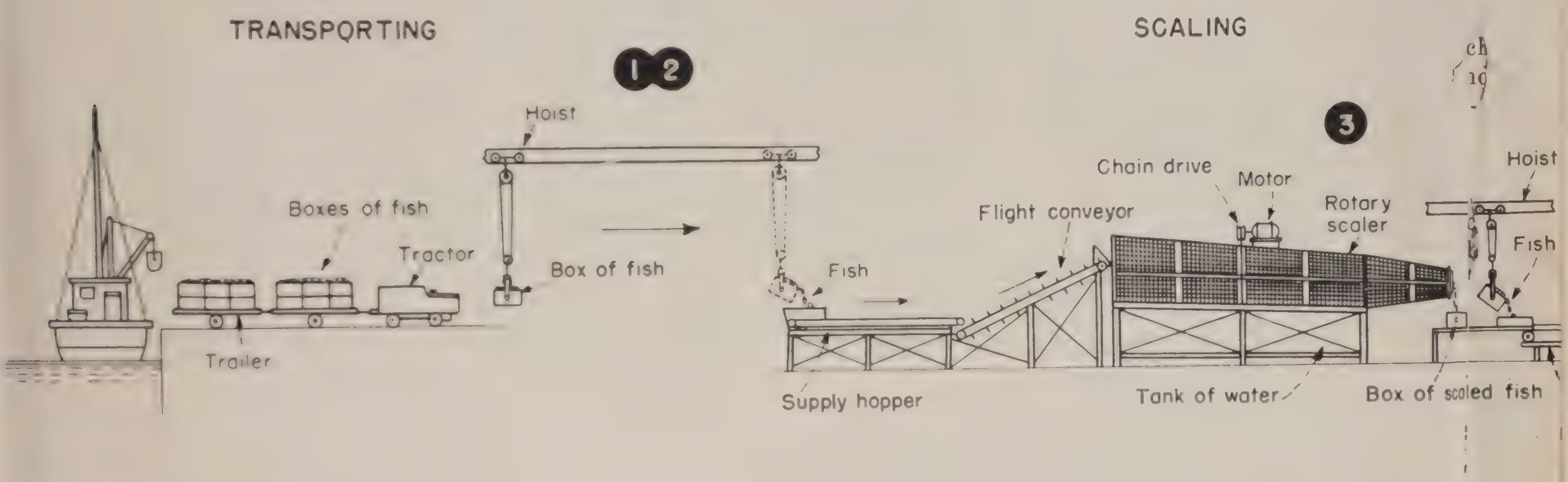
2 **TRAVELING** electric hoist takes 650-lb. box of fish from trailer outside of plant and unloads it into supply hopper of scaler.

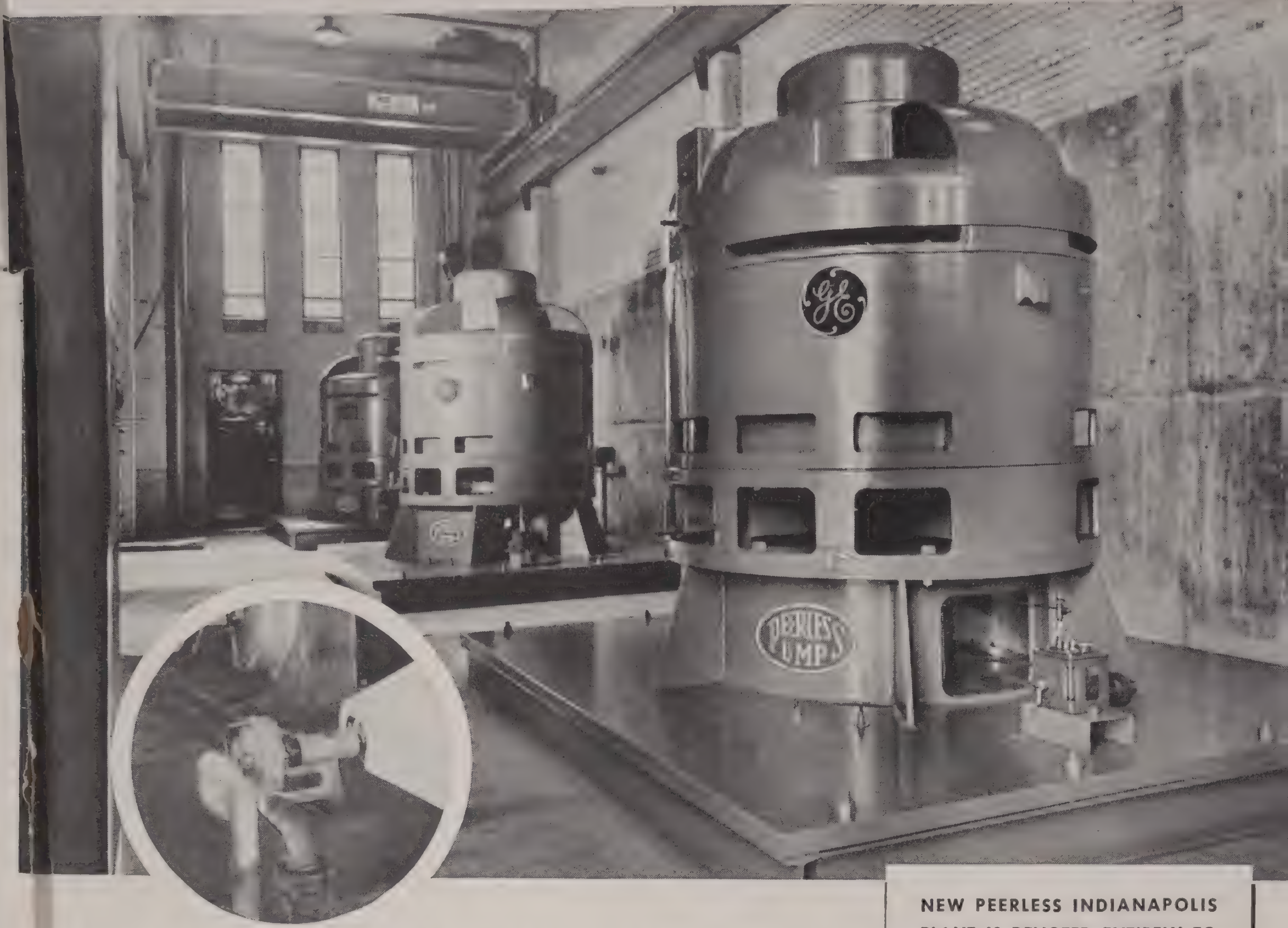
3 **SCALED FISH** emerge from 38-ft. rotary screen scal 40 rpm. Later, hoist carries boxes of scaled fish to cutt


TRANSPORTING
1 2
Hoist
Boxes of fish
Tractor
Box of fish
Trailer
SCALING
3
Chain drive
Motor
Flight conveyor
Rotary scaler
Hoist
Fish
Fish
Supply hopper
Tank of water
Box of scaled fish

7 **PACKING AND WEIGHING** fillets. Conveyor brings brined fillets to line, where operators pack cartons to a 1-lb. net weight.

8 **CARTONS** go to wrapping machine, where they covered and heat-sealed. Rate: About 60 to 65 carton

WIDEST CAPACITY RANGE



FROM A COMPREHENSIVE LINE OF VERTICAL AND HORIZONTAL PUMPS

Peerless offers 2 to 220,000 gallons per minute

A tapful or a torrent! No matter what your water capacity requirements are, Peerless can meet your pumping needs.

Fractional hp horizontals, like the Peerless "Fluidyne" pumps handling cooling-jacket water in the inset above, furnish a few gallons a minute. The huge Peerless mixed-flow pumps in the larger photo, pump away drainage water at the rate of tens of thousands of gallons a minute.

Widest capacity range is but one of a host of reasons why industries, municipalities and commercial businesses plan with Peerless for all their needs for pumps. Here are others:

ALL PRACTICAL HEADS: Lifting water from 1000 feet or more is a practical accomplishment of Peerless vertical deep well pumps. Pumping against heads of 690 feet is a common task for Peerless horizontal centrifugal pumps.

ALL TYPES OF DRIVE: Electric motor, right angle gear, engine, belt (V or flat) or combinations of the above, are all available from Peerless, with pump and driver engineered as a unit.

MODERN DESIGN: Peerless pumps are designed for top flight performance over extended periods of time. And the practical consideration of ease of maintenance and repair is figured in to their functional, good looking design.

NATIONWIDE SERVICE: Peerless sales and field service is available in all principal U. S. cities and abroad. Plan with Peerless for all your pumping needs. Individual bulletins on all types of Peerless Pumps are available upon request.

NEW PEERLESS INDIANAPOLIS PLANT IS DEVOTED ENTIRELY TO PUMP PRODUCTION AND SERVICE

Here is one of America's newest pump plants—19 acres of modern manufacturing facilities devoted to precision production of horizontal and vertical pumps, centrally located at Indianapolis. Plan with Peerless for pumps plus fast, complete pump service.

Peerless
VERTICAL AND HORIZONTAL
Pumps

fmc
PEERLESS PUMPS

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
Los Angeles 31, California
Indianapolis, Indiana
District Offices: New York 5, 37 Wall Street; Chicago 40, 4554 N. Broadway; Atlanta Office: Rutland Bldg., Decatur, Ga.; Omaha, Nebr., 4330 Leavenworth Street; Dallas 1, Texas, 3905 Elm Street; Fresno, Calif.; Los Angeles 31, Calif.

Men, Jobs, Companies

DR. G. R. GREENBANK, research chemist in Bureau of Dairy Industry will receive $1,000 Borden Award in chemistry of milk. Presentation at ACS national meeting, honors him for improving powdered milk quality.

DR. THEODORE H. RIDER, formerly associate director of research for Lever Brothers Co., has been appointed director of research. He replaces John W. Bodman, who becomes firm's chief development consultant.

B. W. FAIRBANKS has been appointed director of American Dry Milk Institute, Chicago. He was formerly in charge of Institute's research, and prior to that was on staff of University of Illinois.

DR. C. O. BALL, who for 19 yr. had been with research department of American Can Co., was recently appointed professor and research specialist in food technology at N. J. Agr. Exp. Station, Rutgers U.

Industry

Airline Foods Corp., New York City, announces the purchase of H. Baron & Co., baking, confectionery and ice cream specialty firm, Linden, N. J.

American Molasses Co. announces merger of its wholly owned subsidiaries, Sucrest Corp. and The Nulomoline Co., into the parent organization. Business conducted by these firms will be carried on by AMC through the newly organized Sucrest and Nulomoline Divisions.

Balentine Packing Co., Greenville, S. C., has begun a $100,000 plant modernization program.

Broder Canning Co., Lethbridge, Alta., Canada, has started construction of a $60,000 addition to its plant.

Burns & Co., meat and produce packer in Calgary, Alta., Canada, is building a $500,000 plant in Edmonton.

California Fruit Growers' Exchange is doubling the plant capacity of its Products Department in Ontario, Calif. New structure will house a Mojonnier low temperature evaporating unit plus cold storage, processing facilities and power plant.

Canadian Canners, Ltd., has elected following officers: E. A. Pearce, president; W. L. Innes, vice-president; D. R. McCahill, vice-president and general manager; and P. Croucher, secretary-treasurer.

City Products Corp., Chicago, announces purchase of capital stock of Frank Pilley & Sons, Inc., dairy and poultry products processor with headquarters in Sioux City, Ia.

Continental Grain Co., Columbus Ohio, has merged with Soy Extraction Co. of same city. The Soy firm has been dissolved but its operations will be continued as soy extraction division of Continental Grain.

Domestic Brands, Inc. of Montreal, Quebec, has started construction of a $50,000 extension to its bakery.

Dixie Frozen Foods, Inc., with headquarters in Atlanta, has acquired a plant at Montgomery, Ala., for processing and distributing its products.

Durkee Famous Foods, a division of the Glidden Co., recently held open house to mark completion of its new margarine plant in Macon, Ga. New unit can produce 70,000 lb. daily of yellow, quartered, ready-to-serve margarine.

H. W. Lay & Co., Inc., Atlanta, plans construction of a $100,000 plant in Jacksonville, Fla., for production of potato chips and other food products.

National Biscuit Co. has awarded a contract for construction of $400,000 building in Elmira, N. Y. New structure will house firm's Elmira area bread baking operations.

Lever Brothers is embarking on a $55,000,000 expansion program which will include a $25,000,000 soap and food products plant in Los Angeles—to be the firm's first West Coast unit.

Sunshine Biscuits, Inc., has acquired the property of Arrow Cutlery Co., Fremont, Ohio. Property will be used for expansion of Sunshine's dairy products manufacturing and storage facilities.

Upstate Baking Co., Lockport, N. Y., has been granted a permit to build a cookie factory and warehouse. Cost is estimated at $150,000.

Valley Packers, Inc., has been organized in Puyallup, Wash., for operation of a quick-freezing plant.

Wilson Farmers' Cooperatives, Wilson, Ark., expects early completion of its $1,500,000 margarine and shortening plant, which was started about a year ago.

Personnel

Stanley Andrews has been appointed director of office of foreign agricultural relations of USDA. He formerly served under General Clay as chief of food, agriculture and forestry group of the military government for Western Germany.

C. E. Barge has been made manager of Borden Co.'s ice cream division in Greenville, S. C.

(Men, Jobs, Companies Continued)

HEADLINE NEWS

for carton users!

The savings made by the revolutionary Palmer *Continuous Motion* Carton Former are truly headline news to those using less efficient methods.

So great are its savings on material and labor that in many cases the machine pays for itself in a matter of months. And from then on the savings are just so much extra profit.

The Palmer forms and glues carton blanks in a great variety of styles at speeds as high as 102 per minute. It is adjustable for many sizes. So simple that one operator can feed and supervise as many as 3 machines!

Waste of carton blanks is practically eliminated. And its continuous motion permits the machine to operate efficiently at top speeds. You always have plenty of speed in reserve for peak production demands.

Turns out better formed and more securely sealed cartons, too—thanks to an exclusive design of mandrels and forming plates and its *continuous motion* which permits longer glueing time — 9 times longer than other machines.

LOOK INTO THESE SAVINGS

Whether you are now using carton forming machines or factory processed folded cartons erected by hand, send us samples and we'll show you exactly what the Palmer can save you.

PALMER

Continuous motion CARTON FORMER

PACKAGE
MACHINERY COMPANY
PALMER DIVISION
SPRINGFIELD 7, MASSACHUSETTS

NEW YORK · CHICAGO · BOSTON · CLEVELAND · ATLANTA · DALLAS
DENVER · LOS ANGELES · SAN FRANCISCO · SEATTLE · TORONTO · MEXICO, D. F.

W. H. MATHEWS, formerly vice-president, has been elected president of Southern Pacific Milling Co., Santa Barbara. He succeeds Kenneth R. Simpson, Jr., who resigned the presidency but remains a director. Since Thomas Parham, secretary-treasurer, also resigned recently to accept position in Oakland, Mathews will be both president and treasurer. Walter Dodge becomes comptroller and secretary.

Edward Cross has been named general purchasing agent for Canada Bread Co., Ltd., Montreal, Canada.

Joseph A. D'Avi has been elected vice-president in charge of operations for Hills Brothers Co., packer of Dromedary food products.

Charles D. Darrigrand, former manager of beef department at Wilson & Co.'s Albert Lea plant, is now manager of firm's new Denver operation.

David E. Downs is new production manager of Krispy Kreme Corp., Winston-Salem, N. C.

Robert C. Evans has been named general manager of Florida Citrus Commission. He succeeds M. H. Walker, resigned.

James G. Flanagan has been elected a vice-president of S. B. Penick & Co., New York City botanicals house.

Bruce Copping, formerly chief engineer of Coca-Cola Co., has been named executive vice-president and general manager of Atkron, Inc., Cuyahoga Falls, Ohio.

Walter A. Franz, general manager of the Pilsener Brewing Co., Cleveland, is now also president of firm.

Martin Hilby has become partner of

(Men, Jobs, Companies Continued)

How TIMKEN® bearings help a gearmotor take care of its teeth

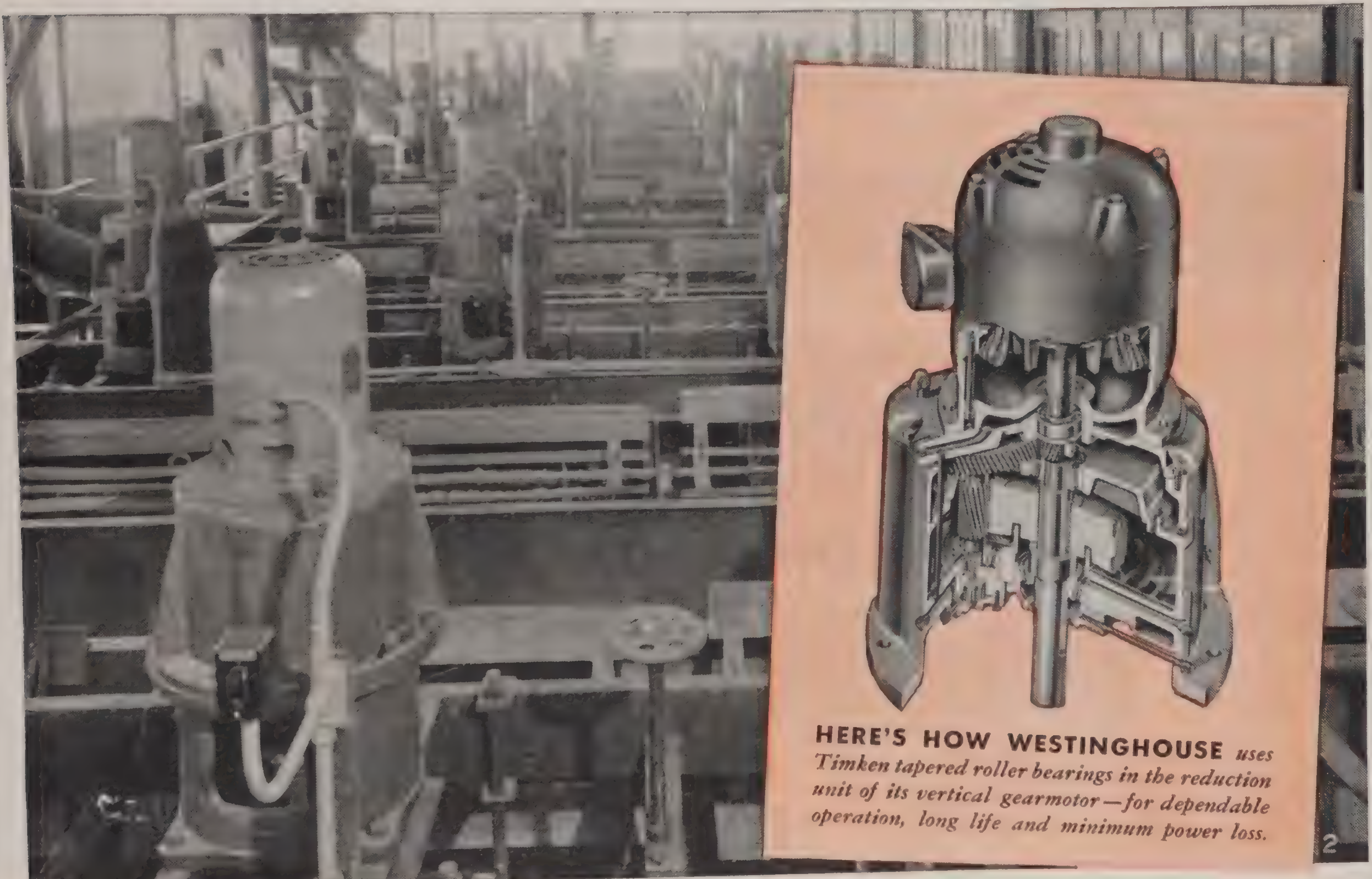
USED to provide on-the-spot power for agitators and mixers, Westinghouse vertical gearmotors have the gear reduction shafts mounted on Timken® bearings to assure smooth gear meshing and long, trouble-free service.

Thrust loads imposed by the vertical operation of the gearmotor are no problem. Due to their tapered construction, Timken bearings carry both radial and thrust loads in any combination. And because Timken bearings operate frictionlessly, power losses are held to an absolute minimum.

With Timken bearings, shafts and gears are kept in rigid alignment. Deflection and end-play are eliminated—gears mesh smoothly at all times. There's less wear on gear teeth. Quiet operation is assured.

Timken bearings are made of the finest steel ever developed for tapered roller bearings—Timken fine alloy steel. They're manufactured to incredible precision, finished to amazing smoothness. No other bearings can give you so many advantages. See that the trade-mark "Timken" is on the bearings of all the machines you build or buy. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN BEARING EQUIPPED *This symbol on a product means its bearings are the best.*



HERE'S HOW WESTINGHOUSE *uses Timken tapered roller bearings in the reduction unit of its vertical gearmotor—for dependable operation, long life and minimum power loss.*

NEW TIMKEN BEARING CUTS RUN-OUT IN HALF!

Until now, the Timken "Zero" bearing has been the last word in bearing accuracy. Now Timken offers industry the "Double-Zero" bearing—*twice as accurate* as the "Zero"! Maximum run-out of the new "Double-Zero" bearing is only 75 millionths of an inch—*half* the 150 millionths run-out of the "Zero" bearing.

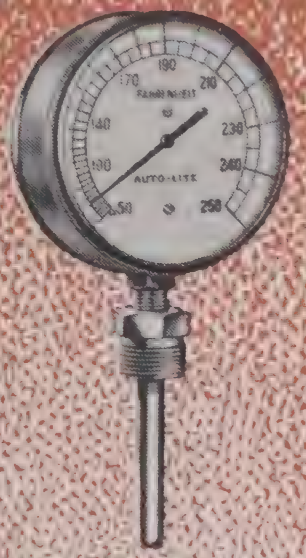
What an opportunity for manufacturers of machines where extreme accuracy is essential! Available in standard single row types, up to 10" O.D. Write for further information.

TIMKEN

TAPERED ROLLER BEARINGS

TIMKEN 1899 50 1949 YEARS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ↕ AND THRUST → ← LOADS OR ANY COMBINATION



Depend on
AUTO-LITE
FOR TEMPERATURE INDICATION

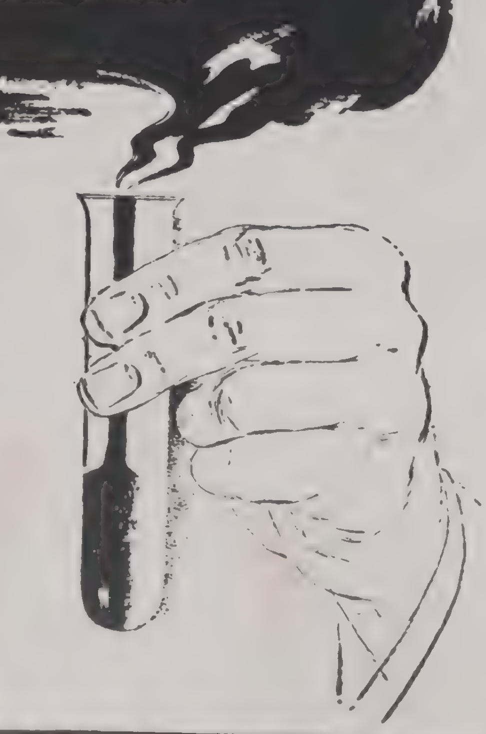
Auto-Lite Thermometers are designed to give you the broadest selection for your needs: Priced low and precision-made for accuracy, these instruments point the way to uniformity in processing and help to prevent waste. Write for catalog showing the many styles and types of Auto-Lite Thermometers that are available.

TYPICAL APPLICATIONS: PROCESSING & CHILL ROOMS, FREEZER, STORAGE & CURING ROOMS

Illustrated, at top: Model G Indicating Thermometer, flush mounting type with capillary tubing for remote reading. Priced from $18. At bottom: Model V Thermometer (vapor pressure type). Rigid stem for direct mounting. Priced from $10.25.

THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION, DEPT. F-9
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO

INDICATING & RECORDING THERMOMETERS



COME TO THE...
22nd EXPOSITION
OF
CHEMICAL INDUSTRIES
ESTABLISHED 1915

NOV. 28
TO
DEC. 3

You'll get hundreds of worthwhile ideas here . . . for research endeavors . . . solving present material, equipment, and production problems . . . for reducing operating and maintenance costs . . . for improving food products . . . for modernizing and expanding food processing facilities. Over 350 manufacturers will be on hand to show, demonstrate, and explain better, faster, and less costly ways to perform your food processing operations . . . to help fit the latest equipment, methods, and practices into your present operations or future plans.

For over 30 years, leaders in food processing and every other phase of the chemical industries have been keeping abreast of newest developments through this great exposition. You, too, can benefit. Don't miss it.

Management International Exposition Co.

5755

GRAND CENTRAL PALACE · NEW YORK

Longstreet-Abbott & Co., St. Louis management consulting firm specializing in service to food and feed manufacturers.

Dr. Lauren B. Hitchcock has been named director of research and development for National Dairy Products Corp. and also president of its subsidiary, National Research Laboratories, Inc.

Dr. Pieter Honig has been appointed technical research director of West Indies Sugar Corp. A graduate of Technical University, Delft, Holland, he has been associated with the sugar industry since 1926.

Steven A. Kostakos, president of Honey Hill Creamery, Chicago, has been elected president of the Milk Foundation, Inc.

James A. Moffett, manager of the foreign department of Corn Products Refining Co., has been elected a vice-president of firm.

Gordon R. Maybee, chief chemist of Fry-Cadbury, Ltd., and chairman of Canadian Committee on Sugar Analysis, recently went to Brussels to attend the 10th session of International Commission for Uniform Methods of Sugar Analysis.

James W. Moller, former chief of edible oils division, fats and oils branch, USDA, has been appointed Pacific Coast Division manager of John F. Jelke Co., whose headquarters are in Chicago.

L. S. Slaughter has been elected vice-president of Telle-Belle Vernon Co., Cleveland. He will be in charge of ice cream operations in Ohio and parts of West Virginia.

Isidor Schweitzer was elected president and treasurer of Nathan Schweitzer & Co., Inc., New York meat packing firm.

Associated Industry

Burbank Cold Storage Co., Burbank, Calif., recently completed its new warehouse. This facility has 794,000 cu. ft. storage space.

Canadian Permag Products, Ltd., announces election of Allan A. Rylander to presidency of the firm.

Carrier Corp., Syracuse, N. Y., an-

(Men, Jobs, Companies Continued)

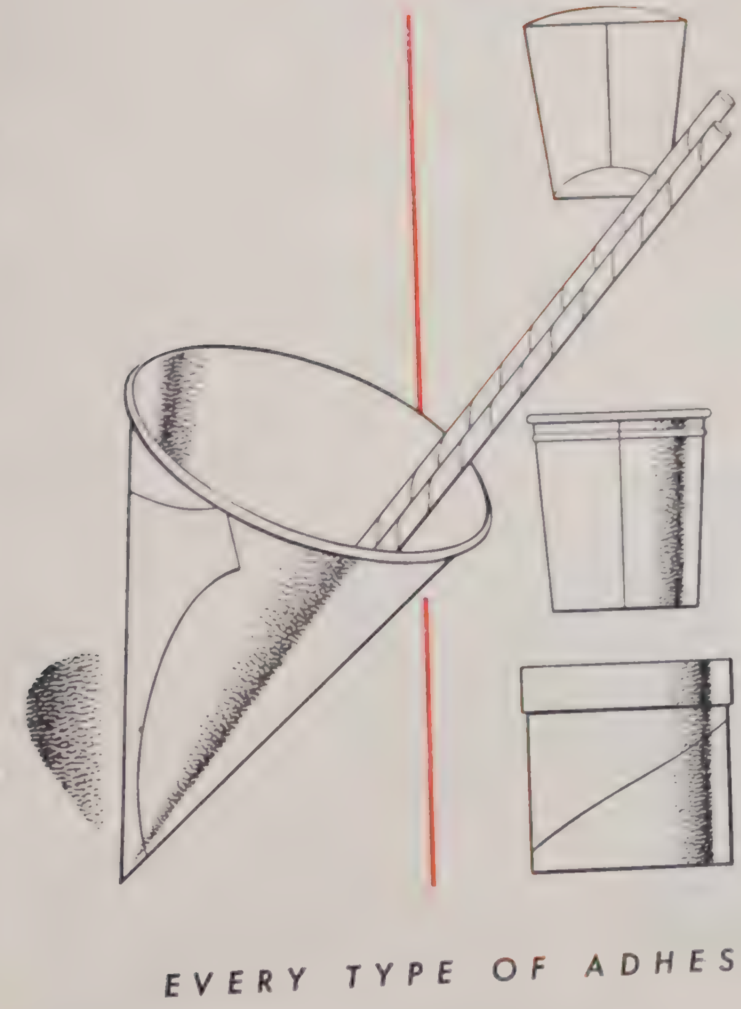
How important is Leakage?

PROVEN! *Synthetic* **RESYN** adhesives that seal in hot or cold liquids far more successfully than vegetable or animal base glues. Why? Because these synthetic resins are inherently insoluble in water. Properly formulated into adhesives by National's process, the bond once set will not redisperse.

National's synthetic **RESYN** adhesives give you full assurance of: **HIGH WATER RESISTANCE** with a bond that can withstand contact with hot or cold liquids for a prolonged time without leakage. **PRODUCT PROTECTION** with a bond that is non-toxic...odorless...free from solvents. **EXCELLENT MACHINEABILITY AT HIGH SPEEDS** with a bond that is quick tacking, fast drying, non-staining and stronger than the toughest paper. **FLEXIBILITY IN USE** with a bond that flexes as easily as the thinnest paper.

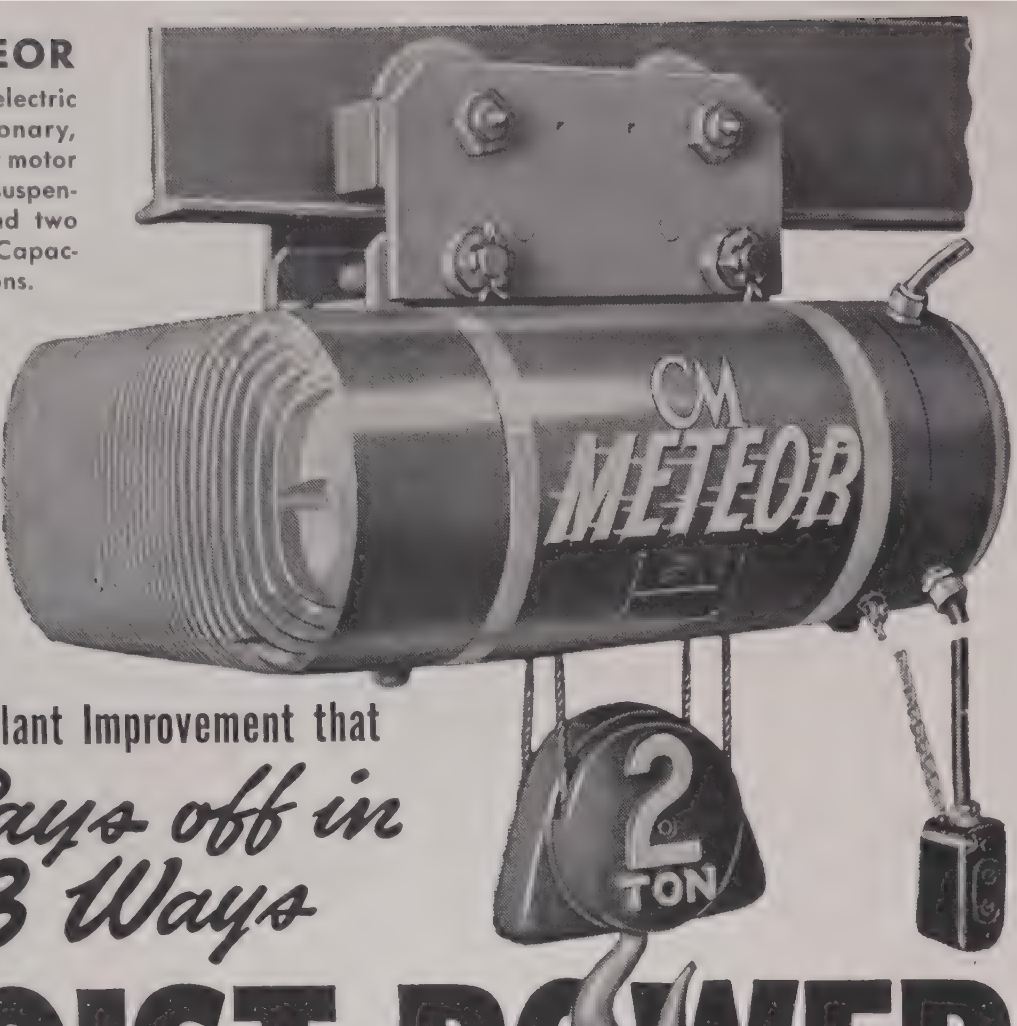
National's synthetic **RESYN** ® adhesives—which are white emulsions that dry to a clean, colorless film—can be precision-applied to your production line by our technicians.

Address: 270 Madison Ave., NEW YORK 16; 3641 So. Washtenaw Ave., CHICAGO 32; 735 Battery St., SAN FRANCISCO 11, and other principal cities. In CANADA: National Adhesives (Canada) Ltd., TORONTO and MONTREAL. In ENGLAND: National Adhesives, Ltd., SLOUGH.



National
ADHESIVES

EVERY TYPE OF ADHESIVE FOR EVERY INDUSTRIAL USE



CM METEOR

- Heavy duty electric hoist for stationary, plain, geared or motor driven trolley suspension. Single and two speed models. Capacities: ½ to 5 tons.

Here's Plant Improvement that
Pays off in 3 Ways
HOIST POWER

LOWERS HANDLING COSTS Picks up raw materials, or finished parts for assembly and moves them along for pennies in power and seconds in time.

ACCELERATES PRODUCTION Takes the slowing up "lags" out of assembly line movement. One man precision "spotting". Speeds up handling in shipping.

IMPROVES PLANT MORALE Saves the backs and muscles of men so that they may produce with "morning" efficiency in late afternoon. Aids in accident control.

Frankly, we don't know how many factories have cut costs by putting CM Electric Hoists on production jobs, but we **do know** they keep coming back for more and more Meteors and Comets. You couldn't ask for more convincing evidence of a product's usefulness to industry than a constantly growing demand.

CM Meteor and Comet advantages are fully described in the complete CM Catalog. Write us for a copy and the name of your local distributor.

CM COMET High speed, sturdy, portable electric hoist. One hand control. Plug in on single or 3 phase power line. Capacities: ⅛ to 1 ton.

CHISHOLM-MOORE
HOIST CORPORATION
(Affiliated with Columbus McKinnon Chain Corporation)
GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.
SALES OFFICES: New York, Chicago and Cleveland • Distributors Everywhere

nounces plans to purchase the C. E. Howard Corp., South Gate, Calif., manufacturer of stainless steel vessels and the recently developed Kelly-Howard Concentrator—a new device for concentrating citrus fruit juices.

Century Electric Co., St. Louis, has appointed Fred H. Pillsbury to post of vice-president in charge of operations.

International Harvester Co. announces plans to construct a wholesale parts depot, estimated to cost $1,000,000, in South Memphis, Tenn.

Johnston Pump Co., Los Angeles, has elected T. W. Simmons as vice-president and general manager of the company. Kenneth G. Lundie was appointed general sales manager.

Mack Truck Co. has named J. G. VanNest director of purchases for firm. He will have buying responsibility for all company plants.

Transparent Wrap Machine Corp., Hasbrouck Heights, N. J., announces appointment of C. F. Van Sweringen to general managership of company.

Worthington Pump & Machinery Corp., Harrison, N. J., announces election of J. J. Summersby as vice-president in charge of sales.

Deaths

H. Kirke Becker, 59, president of Packaging Machinery Manufacturers Institute and also president of Peters Machinery Co., Chicago—June 21, of a heart attack on board *S. S. Mauretania* enroute to England.

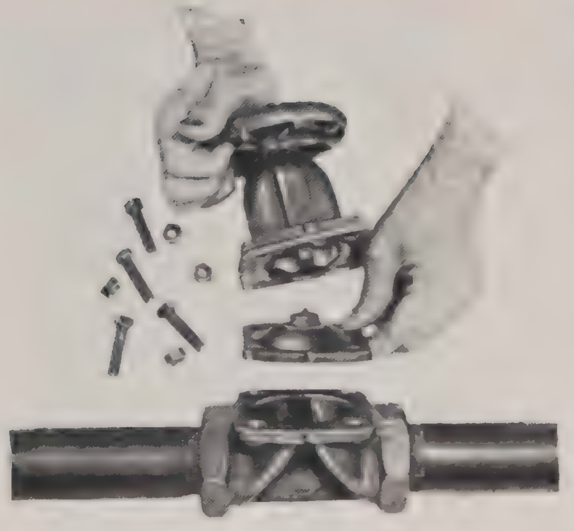
Raymond J. Comyns, 64, on headquarters staff of U. S. Brewers Foundation—July 5, after a long illness, at home in New Rochelle, N. Y.

Charles J. Freeland, Sr., 85, vice-president of American Rice Milling Co. and a pioneer in development of southwest Louisiana's rice industry —at his home in Crowley, La.

John H. Horrigan, 82, nationally known authority on meat distribution and founder of Horrigan & Doe meat packing firm—July 8, West Harwich, Mass.

Donald S. Morgan, 70, president of John C. Morgan Co., cherry processing firm, Traverse City, Mich.—July 8 after a two-weeks' illness. *—End*

Easy as fixing a faucet



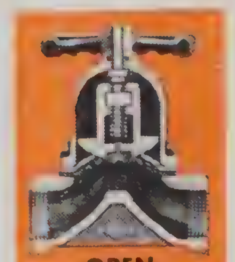
THE GRINNELL-SAUNDERS DIAPHRAGM VALVE has only one part that normally wears and needs replacement . . . the diaphragm. Depending on the type of service, it may last for years or only months. It can be replaced in just a few minutes. The valve body doesn't have to be removed from the pipe line . . . only the bonnet. The new diaphragm is attached to the bonnet which is then bolted back onto the valve body . . . and the valve is restored to service. That's all the maintenance a Grinnell-Saunders Diaphragm Valve normally needs. No packing glands to demand frequent attention. No refacing or reseating required, because there are no metal-to-metal seats to become damaged or wire drawn.

SIMPLE, POSITIVE OPERATION . . . Flexible diaphragm opens wide for streamlined flow, pinches tight for positive closure even when grit, scale or other solid matter is trapped on the weir.

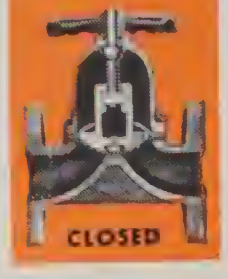
NO CLOGGING . . . MINIMUM RESISTANCE TO FLOW . . . Smooth, streamlined fluid passage without pockets prevents accumulation of sludge and reduces friction resistance to a minimum.

NO CORROSION . . . NO CONTAMINATION . . . NO LEAKS . . . The working parts of the valve are completely isolated from the fluid by the diaphragm. Diaphragm materials, body materials and body linings are available to suit service requirements.

Available in various combinations of valve bodies and operating mechanisms. Write for catalog.



OPEN



CLOSED

99 YEARS

WHEREVER PIPING IS INVOLVED

GRINNELL

Grinnell Company, Inc., Providence, Rhode Island. Branches: Atlanta • Buffalo • Charlotte • Chicago • Cleveland • Cranston • Fresno • Kansas City • Houston Long Beach • Los Angeles • Milwaukee • Minneapolis • New York • Oakland • Philadelphia • Sacramento • St. Louis • St. Paul • San Francisco • Seattle • Spokane

New Packages and Products

Bond's
DILL PICKLE
STIX
Bond's
SWEET MIXED
PICKLES
Bond's
DILL PICKLE
STIX
Bond's
SWEET PICKLE
STIX

Picture-Packs of Pickles

Attractively lithographed metal cans are the containers for Dill Pickle Stix, Preserved Sweet Pickle Stix, Kosher Style Pickle Stix and Sweet Mixed Pickles.

The cans do a triple job: They afford a good medium for the realistic color reproductions of the products, they give protection against breakage and light deterioration, and they are readily stacked, in displays or otherwise.

Bond Pickle Co., Oconto, Wis., the manufacturer, states that by "place-packing" the products in the 12-oz. tins, more pickles by weight are enclosed than in a 14-oz. jar into which pickles are dumped.

Vinegar, spices, salt and alum are added to the cucumber Pickle Stix. The Sweet Mixed Pickles contain cucumbers, cauliflower, onions, peppers, vinegar, salt, spices and alum.

Hamburgers
Chili
Tamales
Frankfurts
Tamales
Hash
Tripe
Spaghetti-Meat
Corned Beef
Prem
Ham
Pork Sausage
Roast Beef
Liver Paté
Veal Loaf

Labels Redesigned, Five New Products Added

Together with an extensive, long-range canned meat advertising and promotional program, Swift & Co., has introduced five new items and has applied a new-look job to all labels.

Canned hamburgers, frankfurters, liver paté, skinless pork sausages, and chopped ham with smoked flavor are the latest offerings. The last two items are termed the only canned products of their kind on the market.

The redesigned lithographed labels feature an attractive red, white and maroon color scheme, with emphasis placed on brand and product identification. Larger sized cans in the line also carry an appealing platter picture of the product on the front, with a practical, kitchen-tested recipe and cooking instructions on back. All items carry U. S. inspection marking on label.

Company's campaign is planned to emphasize suitability of canned meats as "main course" dishes, and it will stress quality, convenience and economy. It is thus anticipated that more homemakers will be influenced away from the idea that canned meats are "just-in-case" rations.

López's
HOMOGENIZED
NOURISHING DELICIOUS SWEETENED
CREAM of COCONUT

Creamed Coconut Juice Offered In Cans

Made from the thick cream-like juice pressed from the meat of ripened fresh coconuts, Lopez's Homogenized Cream of Coconut is now making its debut in metropolitan New York.

This unusual product is prepared under a patented process by the Borinquen Foods Corp., San Juan, P. R. No preservatives are added. Pure juice is simply combined with sugar and salt, then homogenized to creamy consistency. It is recommended that the 12-oz. cans be kept at room temperatures because refrigeration would cause fat separation.

An exotic label was produced by Crocker-Union from the manufacturer's original photo of palm trees silhouetted against fleecy clouds in a deep blue Cuban sky. It gives the package a sales-appealing, standout appearance.

The flavorful liquid can be used in ice creams, beverages, sherbets, pies, puddings, custards, or on pancakes and waffles.

New Cheese Product

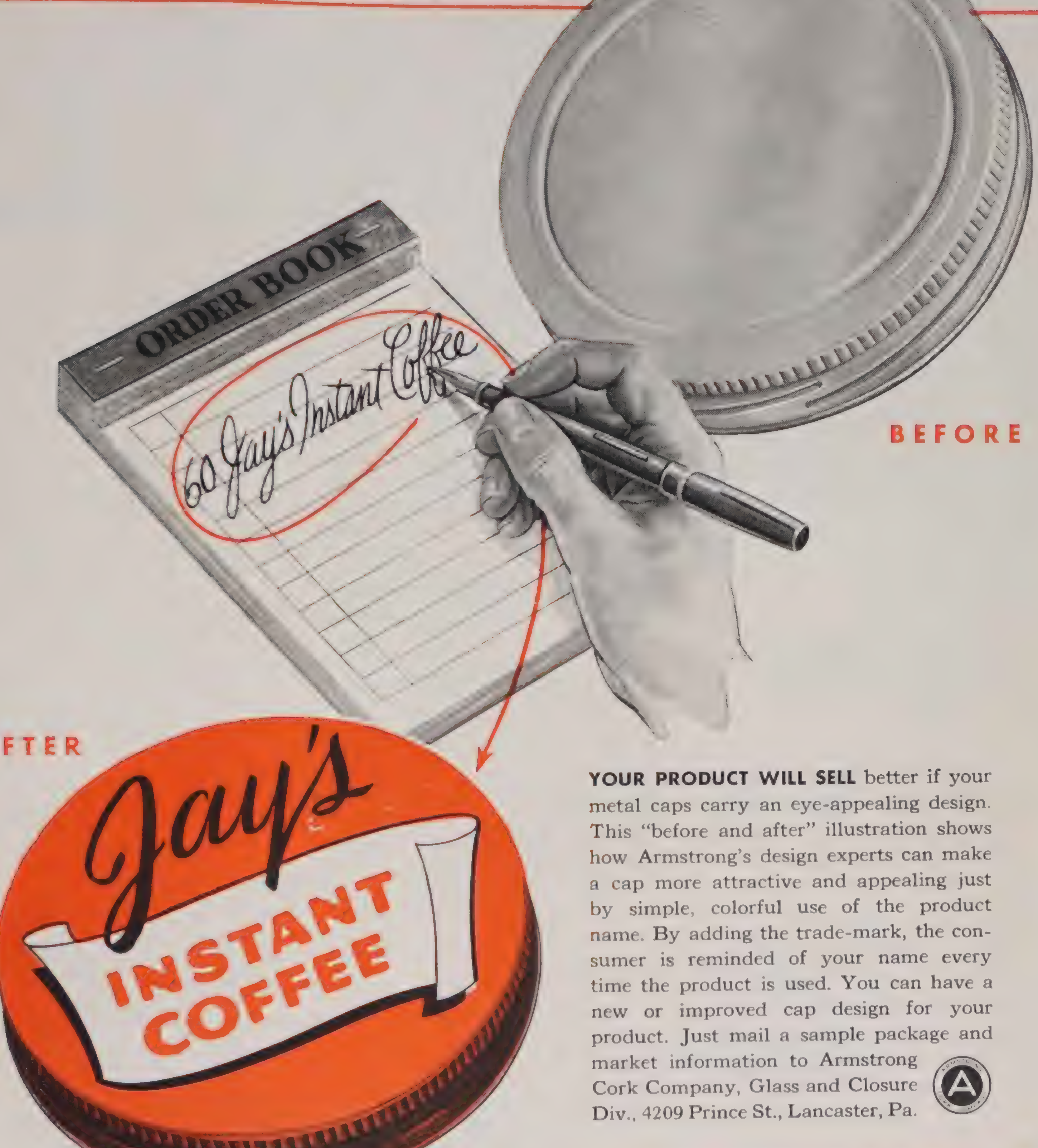
Commercial production of Smorgas, a novel cheese product, has been started by Dahl House Food Products, Inc., Portland, Ore.

Made from a blend of creamery butter, Roquefort-type cheese, spices and condiments, the new product was developed by the company in its restaurant at Oswego, Ore. There are plans to introduce other Swedish-type items.

First distribution of the new item will be confined to western states, but establishment of eastern plants is expected as sales develop.

(Packages and Products Cont'd)

GOOD CAP DESIGN PRODUCES SALES



YOUR PRODUCT WILL SELL better if your metal caps carry an eye-appealing design. This "before and after" illustration shows how Armstrong's design experts can make a cap more attractive and appealing just by simple, colorful use of the product name. By adding the trade-mark, the consumer is reminded of your name every time the product is used. You can have a new or improved cap design for your product. Just mail a sample package and market information to Armstrong Cork Company, Glass and Closure Div., 4209 Prince St., Lancaster, Pa.

Armstrong's Closures

TURN STANDARD CONTAINERS INTO STANDOUT PACKAGES

WEST COAST REPRESENTATIVE: I. F. SCHNIER CO., INC., SAN FRANCISCO 7 AND LOS ANGELES 12

JENKINS stainless steel VALVES
LOOK FOR THE
TRADE JENKINS MARK
Jenkins Bros
DIAMOND MARK
JENKINS stainless steel VALVES

Built to the same quality standard that makes any Jenkins Valve your best buy.

You know it pays — and pays well — to use Jenkins Bronze, Iron and Steel Valves. In industry after industry, these valves bearing the famous Diamond trade-mark have set records for long, trouble-free service and low upkeep cost.

You'll find the same Jenkins quality built into Jenkins Valves of Stainless Steel. Service records show many years of faultless operation in the control of highly corrosive fluids, and liquids which may become contaminated or discolored by contact with other metals.

More and more Stainless Steel Valves have been added to the Jenkins line as the need has developed in such industries as food processing and packing, chemical, textile, petroleum, pulp and paper, and rubber. Today it includes Gates, Globes, Angle, "Y" and Check Valves in a range of sizes to answer most requirements.

A new data folder just off the press, describes the complete line of Jenkins Stainless Steel Valves, and contains valuable information on selection of the proper alloy for the service.

If your plant handles corrosive liquids, or fluids that must be kept absolutely free from contamination or discoloration, you will want this new Data Folder. Ask for Form 194. It will help you select the right Stainless Steel Valve for your requirements. Write for a copy today.

Jenkins Bros., 80 White St., New York 13; Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago; San Francisco. Jenkins Bros., Limited, Montreal, Canada.

Sold through industrial distributors.

Here's the story of the

COMPLETE LINE

of

JENKINS

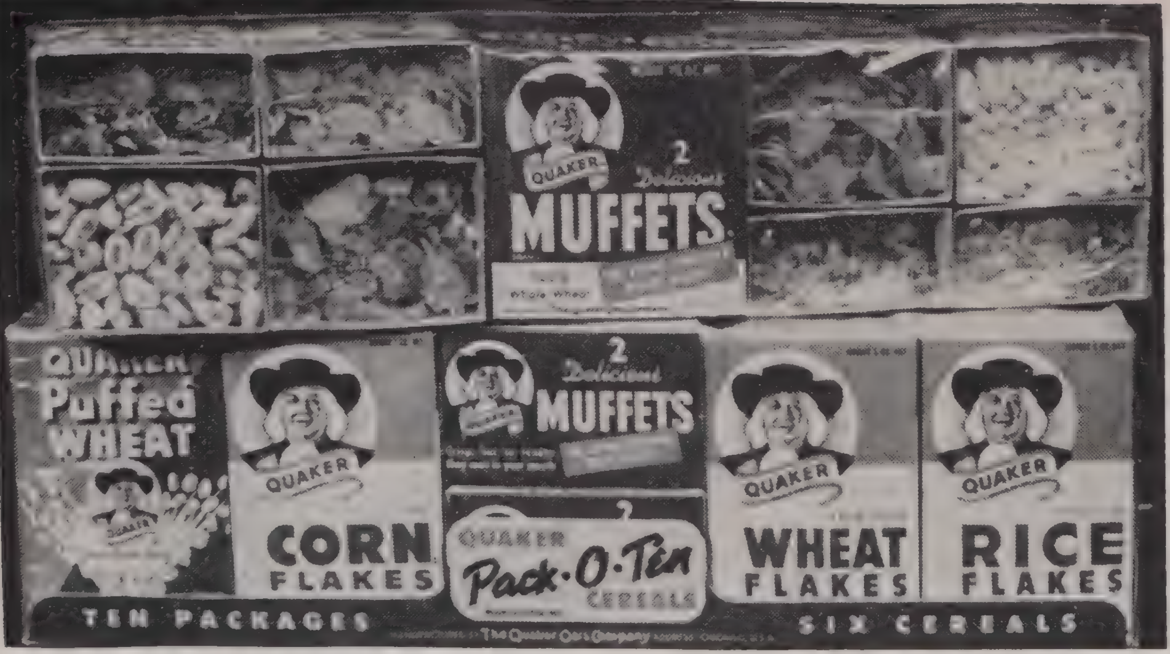
Stainless Steel

VALVES

JENKINS
LOOK FOR THE DIAMOND MARK
VALVES

SINCE TRADE JENKINS MARK 1864

Jenkins Bros



Cereals Packed With a View

Top-side visibility is an outstanding feature of the new sleeve package recently introduced by The Quaker Oats Co., Chicago.

Called "Pack-O-Ten", the novel container holds individual servings of six different prepared cereals—Puffed Wheat, Toasted Corn Flakes, Muffets, Toasted Wheat Flakes, Toasted Rice Flakes and Puffed Rice.

Muffets are packed in regular closed boxes. But all the other cereals are in the open-end boxes, which are both filled and wrapped on a volumetric filling machine. Each box is covered with 300 MST-54 cellophane and then assembled in a die cut tray. The filled tray is next overwrapped with 450 MST-54 cellophane.

Sleeve packs are of bleached Manila board. The tray or boat has no end lock, but is simply bent up at the score.

National retail distribution is underway.

CROSSE & BLACKWELL
CORNED BEEF HASH
CONTENTS 7½ OZS.
PACKED IN BALTIMORE, MD. BY
THE CROSSE & BLACKWELL CO.

Corn Beef Hash Economy-Packed

Offering convenience and economy for the small family, 7½ oz. metal cans of corned beef hash are being packed by the Crosse & Blackwell Co., Baltimore, Md.

Enough of the popular meat dish to serve two persons is supplied in each can. Ingredients include: Potatoes, cooked beef, onions, salt, spices and sodium nitrate.

Test-marketing is underway in about 2,000 stores in metropolitan New York area.

SALAD BOUQUET

New Versatile Seasoning

A new liquid seasoning for salads, vegetables and meats—Salad Bouquet—is being distributed in selected markets by National Vinegar Co., St. Louis. Product is pasteurized and vacuum packed.

It is recommended wherever a tangy, sweet-sour flavor is desired. Contents listed on the label are spirits, cereal sugar and cider.

Design of the shipping carton for easy conversion to a self-display unit is one of introductory features. The packing case is marked with a dotted-line guide for forming a display tray.

Label is bright red and green. Carton as well as pint and quart bottles are manufactured by Owens-Illinois Glass Co., Toledo, Ohio.

(Packages and Products Cont'd)

Problem:
to cut down on
pump failures in
moving fluids.

Solution:
Specify long-life,
dependable pumps
by Eastern

Built to stand the gaff of long, multiple-cycle non-lubricating liquid pumping, Eastern GW Series Pumps operate efficiently and economically. They're quiet, consume little power and deliver uniform performance day in and day out.

The Eastern GW Series is precision-built in two sizes: GW-1, rated at ½ G.P.M. and GW-2, rated at 1 G.P.M.—against pressures up to 200 P.S.I.—plenty of pumping power and volume for normal liquid transfer applications.

CHECK THESE FEATURES

Stainless steel drive gear; graphite carbon composition driven gear; no metal-to-metal contact; graphite impregnated bearing; hydraulically balanced; lifetime mechanical seal; tough bronze construction.

You can get immediate deliveries on both Eastern GW Series Pumps. They are supplied with 1/6 or 1/4 H.P. motors; belt driven or flexible coupling driven units are also available.

WRITE FOR FULL DETAILS

Eastern
INDUSTRIES, INC.
306 ELM STREET
NEW HAVEN 6, CONN.

400° F. ABOVE

EFFECTIVE LUBRICATION AT MOST ANY TEMPERATURE

70° F. BELOW

The fact that LUBRIPLATE Lubricants are able to meet extreme temperature conditions, demonstrates the ability of these products to cope with the wide variations found in everyday industry. Besides this feature LUBRIPLATE Lubricants possess attributes not found in conventional lubricants.

Write for a copy of "The LUBRIPLATE FILM" written especially for your industry.

LUBRIPLATE

FISKE BROTHERS REFINING CO.

NEWARK 5, N. J.
TOLEDO 5, OHIO

DEALERS FROM COAST TO COAST
CONSULT YOUR CLASSIFIED TELEPHONE BOOK

A New Improved
UNIVERSAL COLLOID AGENT

IT SUSPENDS . . .
IT GELS . . .
IT EMULSIFIES . . .
IT STABILIZES . . .
IT THICKENS . . .

We are now producing from Carragheen two new improved types of gelose. One of them should be the answer to your emulsifying, suspending, thickening or stabilizing problems.

KRIM-KO GEL is an all-purpose colloid-assistant. Properly used, it has been proved effective in many of the most exacting food, pharmaceutical and industrial applications.

CARRAGAR is an agar-type gelatin which forms tender, fruit-like gels over a wide pH range. It does not require acidulation to produce desired results.

Send for free liberal working samples for experimental use.

KRIM-KO Corporation
SEAPLANT PRODUCTS DIVISION
NEW BEDFORD, MASS.

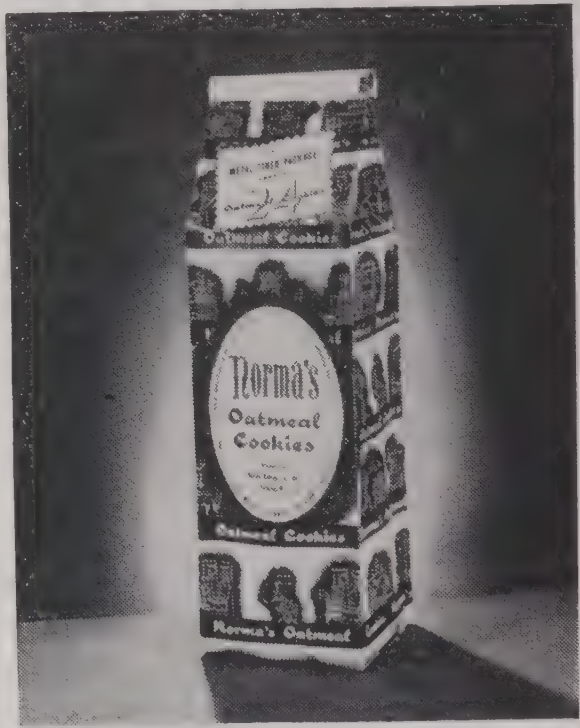
Kitty Clover
SHELLED
POP CORN
12 OUNCES

Popcorn In Cone Containers

To attract "buy-attention" of shoppers, as well as to keep the kernels fresh, Kitty Clover shelled popcorn is now mechandised in 1 pt. paper, cone-shaped bottles printed in red and blue.

Paraffin waxing protects contents against moisture loss or gain. Also, the tight-fitting "hoodseal" cap can be replaced on the package to preserve unused portions of the corn.

Company testing has shown that the new package preserves the corn's "popping jitteriness" extremely well. Present distribution is in Iowa, Nebraska, Kansas and Missouri.



Foil-Lined Bag for Cookie Quality

To protect crispness and fresh flavor, foil-lined bags are used by Norma Baking Co., Trenton, N. J., in marketing a new line of cookies.

Containers are sealed at the bakery to be virtually air-tight and moisture

(Packages and Products Cont'd)

CORROSION COSTS INDUSTRY

$6,000,000,000.00

ANNUALLY!

How much do you pay?

FOLLOW THE LINE OF AMERCOAT RESISTANCE
GUARD AGAINST CORROSION AND CONTAMINATION
Amercoat
AMERICAN PIPE AND CONSTRUCTION CO.
A SYSTEM OF SURFACE PROTECTION

Don't risk needless waste

If all corrosion were as obvious as it is in steel pipe, industry would do more about it. But it is not. Often hidden or unnoticed – indoors and outdoors, above ground and below ground – corrosion takes its daily toll. Acids, alkalis, salts, gases and atmospheric conditions all are contributing factors. As a result, industry pays a terrific bill for corrosion – far more than it should. Your own cost, too, may be greater than necessary. Minimize your risk – do these two things now –

1. *Check up on your costs;*
2. *Provide adequate protection for danger points.*

Experienced and competent AMERCOAT engineers are available to help you on both. They'll check up on your costs, which may be greater than you know because the effects of corrosion are often hidden. They'll report on conditions as they find them. They'll recommend steps to take if greater protection can be provided and money saved. Inquiries from interested executives will receive prompt attention. There's no obligation – write today.

AMERCOAT DIVISION
AMERICAN PIPE AND CONSTRUCTION CO.
Dept. 3D, 4809 Firestone Blvd., South Gate, Calif.

Relishes are TASTIER when Seasoned by FRITZSCHE

To be flavor-wise is to economize. Those who know flavors and how to use them can perform miracles of fine flavoring at minimum cost simply by using the right combination of ingredients. You don't have to be a flavor expert, however, to achieve such results. If you want to produce better flavored relishes and condiments more economically, let F.B. *"Controlled" Seasoning* come to your assistance. This unfailing technique is the result of over 75 years of food flavoring experience. Write us for details.

FRITZSCHE Brothers, Inc. *Est. 1871*

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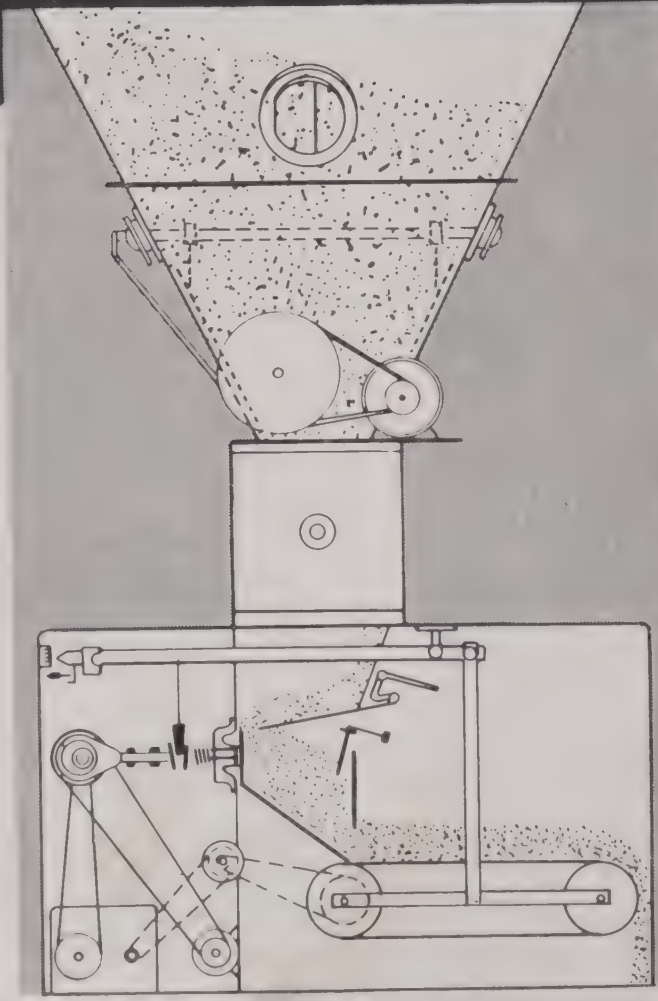
BRANCH OFFICES *and* *STOCKS: *Atlanta, Ga., Boston, Mass., *Chicago, Ill., Cincinnati, O., Cleveland, O., Dallas, Tex., Detroit, Mich., *Los Angeles, Calif., Philadelphia, Pa., San Francisco, Calif., *St. Louis, Mo., *Toronto, Canada and *Mexico, D. F.*
FACTORY: *Clifton, N. J.*

For Blending or Proportioning Food Mixes



OMEGA DRY FEEDERS

The OMEGA BELT TYPE GRAVIMETRIC FEEDER, designed for dependable weighing and feeding of dry materials, handles either fine or coarse ingredients. It feeds continuously and automatically with an accuracy of 99% or better. The OMEGA Gravimetric Feeder is ideal for continuous or batch blending and proportioning of dry mix food products . . . such as sugar, flour, salt, cocoa, beatrene, powdered milk, magnesium carbonate, and leavening mixes. Write for Bulletin.

OMEGA MACHINE COMPANY
(Division of Builders Iron Foundry) 84 Codding Street, Providence 1, R. I.

proof. As a result, shelf-life is notably extended. Distribution can thus be effected through customary grocery channels.

First two varieties of cookies to be test-marketed by this new firm are an old fashioned oatmeal cracker and a natural-flavor vanilla wafer. Bags for both are distinguished by over-all antique designs.

The oatmeal bag is yellow, pink and brown, and in a variety of illustrations (see photo), grandma is shown rolling out the dough, cooking on an old coal stove, and sitting in the parlor with the gramophone.

Vanilla snacks are packaged in cream, blue and rust-brown. And here the illustrations comprise charming houses, antique clocks and chairs, and other mementos of by-gone days.

FRESH
ONE POUND NET WEIGHT
Potato Chips
Buckeye

Novel Potato-Chip Pack

Housewives should be inspired to serve potato chips with sandwiches by the new chip package introduced by Buckeye Foods, Inc., Columbus, Ohio.

The picnic lunch vignette, featured on the front face of bag to create impulse sales, is an attractive reproduction of an original color photo.

Package is colodense-printed cellophane in red, white and blue. Shellmar Products Corp., Mt. Vernon, Ohio, supplies it.

Tiny 'Taters in Tins

Midget-sized whole white potatoes, more than 36 per No. 2 can, have recently been introduced by Hungerford Packing Co., Hungerford, Pa.

This new item will be marketed under the York County Dutch and Pennsy labels. Distribution will initially be in the eastern markets.

—End

FOIL

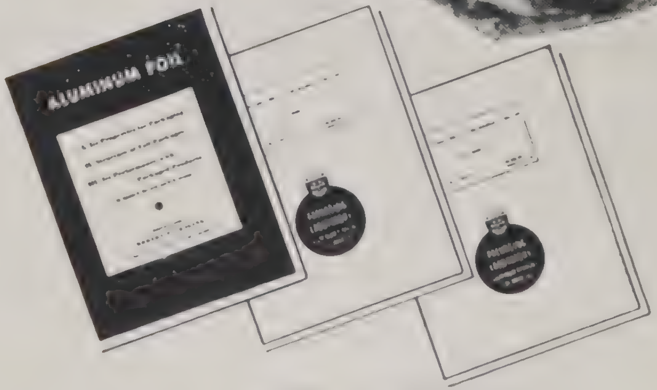
ALCOA PACKAGING REPORT NO. 49-4

1,000 hr. high humidity test proves
Alcoa Foil Wrap stops seepage . .
protects product quality

NEW DEPARTURE
1306
MADE IN U.S.A.

OBJECT OF TEST: Develop a type of wrapper to simplify the present wrapping procedure for steel bearings . . . give better protection. Thirteen different kinds of packaging materials and methods were tested, using Alcoa Aluminum Foil, and other kinds of wrapping materials. Length of test: 1,000 hours. Storage conditions: 106° F at 92% relative humidity.

CONCLUSIONS: "Alcoa Foil proved best. Polished steel bearing races showed *no corrosion* on the elapse of test when wrapped as follows: bearings were dipped into anti-rust oil and drained until free from excess oil. The oiled bearings then were wrapped in .00035″ embossed A medium Alcoa Aluminum Foil, wax-laminated to 25 lbs. red paper. Foil stopped seepage of oil from exterior surfaces of polished bearing races contacting the wrapper." Reason: foil has a moisture-vapor transmission rate of nearly zero. Gives full packaging protection to products from perishable foods to corrosive metals. For more information about Alcoa Aluminum Foil, and the names of package manufacturers who can put it to work for your product, write ALUMINUM COMPANY OF AMERICA, 1845J Gulf Building, Pittsburgh 19, Pennsylvania.



FACTS ON FOIL

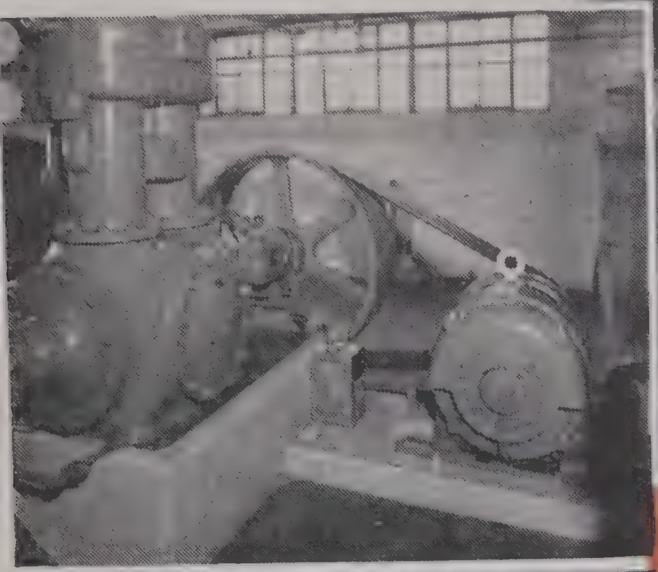
Further information on the results of Alcoa Packaging Laboratory tests is available. Write us concerning your packaging problems.

ALCOA ALUMINUM
REG. T. M.

ALCOA ALUMINUM FOIL

THE QUALITY PACKAGING MATERIAL FOR QUALITY PRODUCTS

● Century 100 horsepower squirrel cage motor driving a refrigeration compressor.

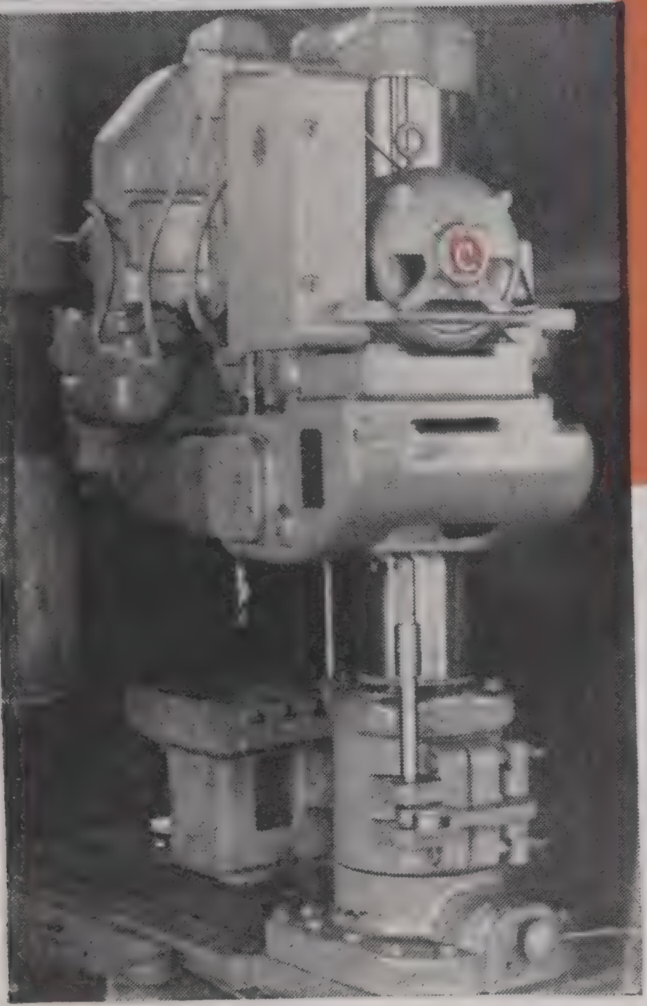


● Century 125 horsepower motor in a large factory driving a pump.

Century MOTORS

Stay on the Job

—Provide Satisfactory Performance Throughout a Long Motor Life



● Century 5 horsepower squirrel cage motor driving a radial drill in a large metal working department.

There is a *correct* Century motor available to furnish economical power for all popular industrial and commercial applications.

Century polyphase motors are available in addition to the type SC for all normal torque applications—type SCH for high starting torque; type SCT for high torque with high slip; type SR for high starting torque with low starting current and adjustable varying speeds; and Selective Speed Drives for flexible control of automatic operations.

For protection against atmospheric hazards Century offers:

Drip Proof General Purpose Motors — protection against falling solids and dripping liquids.

Splash Proof Motors — protection against splashing liquids, rain, snow, sleet and ice.

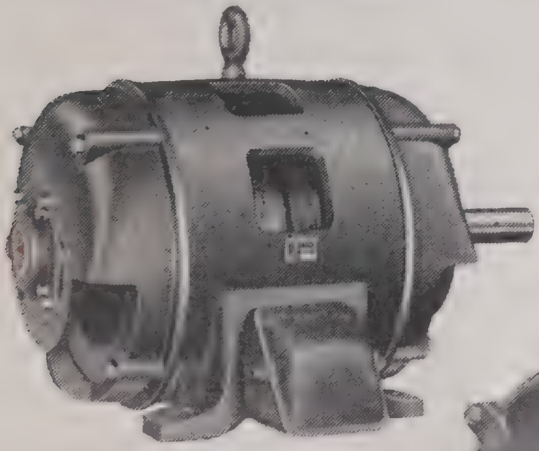
Totally Enclosed Fan Cooled Motors — protection against dusts, mist and fog.

Explosion Proof Motors—protection against explosive dusts and gases.

Century motors are built in sizes from 1/6 to 400 horsepower for operation on single phase, polyphase and direct current.

Specify Century motors for all your electric power requirements.

Popular types of standard ratings are generally available from factory and branch office stocks.



400 horsepower squirrel cage ball bearing motor.

Century open protected squirrel cage motor.

CENTURY ELECTRIC COMPANY

Century C MOTORS

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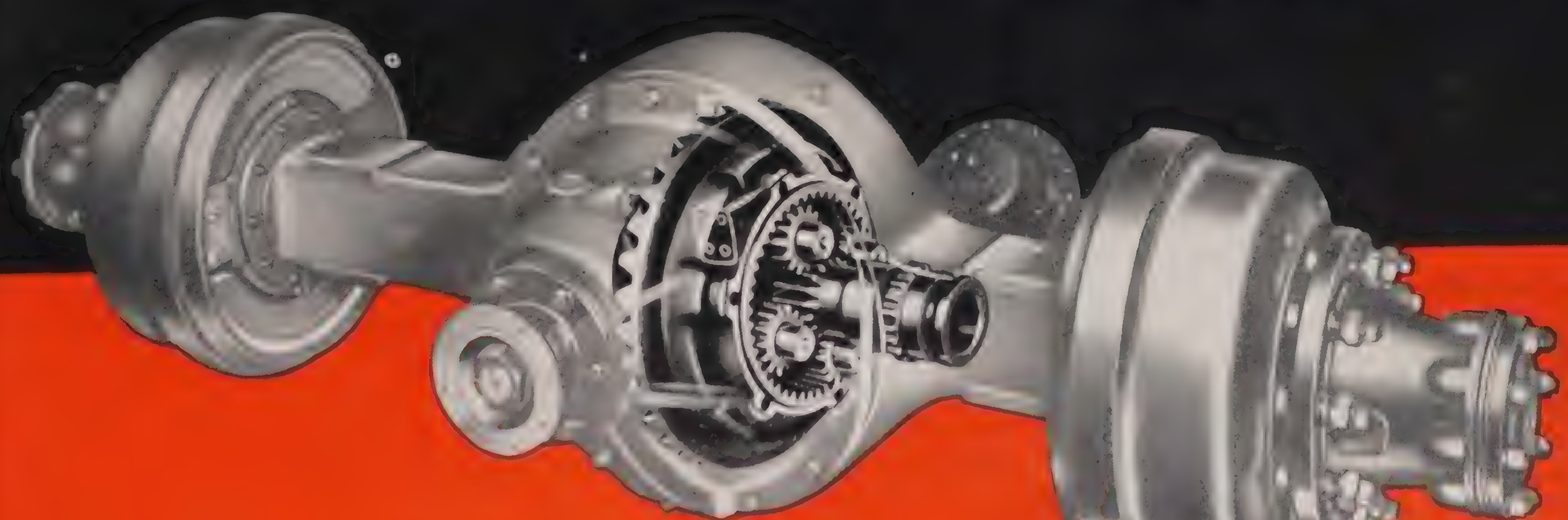
AXLES

Eaton's exclusive planetary gearing distributes gear-tooth load, reduces stress and wear on gears and bearings, adds thousands of miles to axle life, holds maintenance costs to a minimum. Slower planetary gear movement makes for easy shifting and silent operation. Available for most trucks of the 1½-ton class and larger, Eaton 2-Speed Axles give extra pulling power combined with high speed; save time, fuel, oil, and engine wear. *They more than pay for themselves.* Ask for a road demonstration . . see the Eaton advantages for yourself.

More Than a Million
Eaton 2-Speed Axles
in Trucks Today



Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

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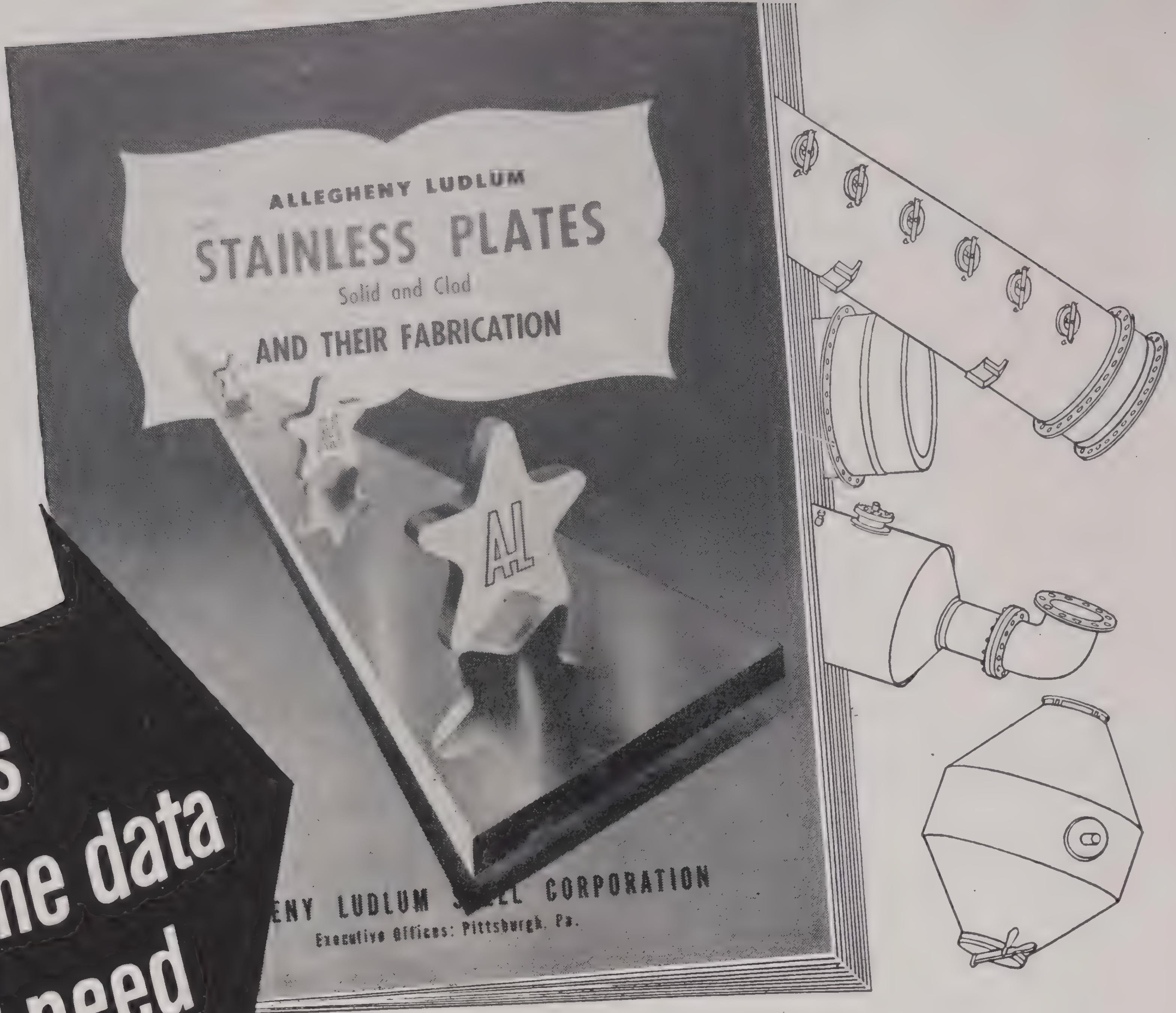

Here's all the data you need on Allegheny Metal Plates

For certified data on individual grades of Stainless Steel, use

ALLEGHENY LUDLUM BLUE SHEETS

There is a Blue Sheet for each individual grade of Allegheny Metal, giving full information on its physical and chemical properties and characteristics. Let us send you this certified, laboratory-proved data on the stainless grades in which you are interested.

ADDRESS

DEPT. F-79

For any job you may have which involves the handling of large volumes, heat and high pressures—either singly or all at one time—you can get Allegheny Metal solid or clad plates in the exact stainless grade you need to combat corrosion, oxidation and contamination.

Some of these grades are *new* . . . comparatively recent developments of our research and experience as a pioneer and leader in stainless steel production. Others are improved versions of older analyses. The latest information on the entire subject of stainless plates is available to you in the booklet illustrated above—32 pages of valuable data on types, sizes, finishes, fabricating methods and uses, including ASTM and ASME boiler codes.

Specify "Allegheny Metal" for complete reliability in stainless steel plates, and write for your copy of the A-L Plate Book.

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Food Industry News

Full Appropriations Granted USDA To Carry Out RMA Provisions

The Department of Agriculture's research activity most directly affecting food processors—the Research & Marketing Act—has gotten its full appropriation from Congress to carry out its projects for the next year—\$19,000,000.

This is almost \$6,000,000 more than RMA had in its budget last year. Most of the new money will go to expand projects started last year. About one-fifth will go to new research.

Of the \$19,000,000, about \$1,000,000 will be used this year for research projects to be carried out under contract with non-department research organizations. Last year, \$900,000 was allotted for outside research.

Following the recommendation of the agricultural research policy committee—a committee of leaders in food and agriculture set up under RMA to advise the Secretary of Agriculture—attempts will be made during the next year to direct more research toward converting farm production from surplus grain and cotton to livestock and dairy products.

The agricultural research policy committee asked, during its June meeting, that the RMA staff prepare a report to indicate what could be done along this line. The report will be made to the group when it meets again in September.

After two years of operation, results of many RMA projects are coming in. Among the recent reports are:

"Marketing practices of cooperatives processing canned and frozen fruits and vegetables"; "Availability and prices of certain fresh fruits, canned fruits, canned juices, and dried fruits in retail food stores, April 1949," and "Rice preferences among household consumers."

Following is a list of new projects planned by RMA of interest to food processors, (unless otherwise noted, the project is being carried out by the Bureau of Agricultural & Industrial Chemistry):

Development of a method to measure bitter principles in orange juice.

Study of the fundamental characteristics of fruit tannins, to avoid darkening and off-flavor developments in preparing and storing processed fruits.

Processing and utilization of lard and other meat byproducts to increase nutritive value and increase consumer acceptance. (Directed to problems of small packers and farm and food locker plant slaughterers.)

Refrigerated storage of liquid fruit products to preserve high quality after processing by the high-short method of sterilization.

Study of the fundamental factors that influence texture in processed berries as means of developing improved processing technics.

Influence of frozen concentrated citrus juices on the price structure and marketing practices for canned citrus juice and fresh fruit (Production & Marketing Administration).

Study of the effectiveness of producer cooperatives in reducing costs of assembling milk from farms (Farm Credit Administration).

Canadian Food Output Down in 1st Quarter

Production in Canadian food processing factories was down for the first quarter of 1949, according to figures of the Dominion Bureau of Statistics, Ottawa, and a survey made by the weekly *Toronto Financial Post.* Many food items had a sharp drop in the first quarter of 1949, with only a few showing an increase.

Among the increases were soda biscuits, which reached an all-time production peak of 13,300,000 lb., up 7.7 percent over same period in 1948. Ready-to-serve cereals were up 40 percent in production in the period over 1948, partly due to mild winter and swing away from hot cereals. Production of canned soups was up, after previous drop of some soups, especially tomato soup. Greater availability of tomato and fruit juices, spaghetti and beans, have also cut into the soup market.

Processed foods showing a drop in the first quarter of 1949 were: Plain and fancy biscuits, off 4.3 percent, with other fancy baked goods and candy topping fancy biscuit demand. Chewing gum production was down 35.7 percent in expectation of removal of 30 percent excise tax which came early in April. Production has since been upped again, with price back to prewar, and an increase in per capita use of chewing gum of 30 percent is shown over prewar.

Chocolate bars and chocolate confectionery production were down, the first 23.8 percent and the latter 7.1 percent due to price. With cheaper cocoa and other raw materials now available in world markets, production in chocolate candy is expected to increase as prices get back to prewar.

Jams, marmalades and jellies showed big production drop, 35 percent on jams, 51.3 percent on marmalades, 32.6 percent on jellies, due to overproduction in 1948 and price-cutting tactics of some producers having heavy inventories. No drop in retail sales is shown. Baked beans show production drop of 39.4 percent, due to heavy production last year and number of new canners entering the field last year.

(Industry News Continued)

Map Wheat-Pact Action

Machinery for administering the world wheat pact was set up in Washington, in July, when the International Wheat Council met. Secretary Brannan (center), who opened the meeting, is seen here chatting with Edwin McCarthy (left), Australian Secretary of Commerce & Agriculture, and F. Shedd Anderson, United Kingdom.

Food Profits in 1st Quarter

AGGREGATE profit and loss statement for food manufacturers for the 1st quarter of 1949 indicates that profits, on the average, were down. This compilation is based on reports of the Securities & Exchange Commission.

Figures are given in thousands.

	1st Q. 1948	4th Q. 1948	1st Q. 1949
Net sales	6,991	7,448	7,108
Costs and expenses	6,639	7,043	6,782
Net operating profit	353	405	326
Other income or deductions, net	—2	4	4
Net income before Federal income taxes	351	409	330
Provision for Federal income taxes	150	165	141
Net income after Federal income taxes	201	244	189
Surplus at close of preceding quarter	3,946	4,301	4,274
Dividends paid	99	162	102
Other surplus credits and charges, net	—21	—25	—2
Surplus at close of this quarter	4,028	4,358	4,358
Depreciation and depletion	....	85	80

Food Company Statements Show Mixed Earnings

While aggregate food company earnings in the first 1949 quarter were down from last year, as reported by the Securities & Exchange Commission, individual reports, covering varying periods, were mixed. Gerber, Heinz, General Foods, Beatrice Foods, and American Molasses showed increases. On the other hand, General Mills, Ward Baking, Continental Baking, Standard Brands, and Armour showed declines.

Reporting for the year ending March 31, Gerber Products Co. revealed net sales of $39,036,063, compared with the previous year's $29,559,179. Net earnings were $2,750,381 against $2,095,668.

World sales of H. J. Heinz Co., for the year ending April 30, reached a new record high of $174,877,723, a 3.2 percent gain over the previous year. U. S. sales of $126,146,500, however, were 1 percent under the previous year. Consolidated net income amounted to $6,451,048, compared with $5,033,324 the year before. Last year, $1,000,000 was added to the company's contingency reserve, while no such appropriation was made in this latest report.

Earnings Increase

General Foods' net sales for the first six months of 1949 were $240,400,000, compared with $224,567,000 for the same 1948 period. Earnings were $14,400,000 against $13,897,000.

First quarter sales for Beatrice Foods Co. amounted to $45,983,497, compared with $45,938,313. Earnings showed a relatively large increase, due to higher unit sales, amounting to $800,750 compared with $681,220 in the comparable 1948 period.

American Molasses Co. showed 3rd quarter earnings of $88,075, compared with $65,302 in the same 1948 period. Earnings for the nine months ended March 31 came to $204,874, against $175,471 in the 1948 period. Net sales totals did not appear with the statement.

Despite its decline, General Mills' net earnings were the second highest in history. Sales for the fiscal year amounted to $410,646,564, compared with $458,473,576 for the preceding year. Earnings were $11,654,036, compared with $13,068,057. Payments to employees reached a new high of $43,722,495.

Strike Lowers Sales

Ward Baking Co., with two of its 21 plants struck for most of the period, showed a net sales decline for 28 weeks ending July 9. Sales totaled $40,754,684, compared with $44,094,187 for the first 27 weeks of 1948. Net income for the 1949 period was $1,430,203, against $1,665,641.

With the same New York strike to contend with, Continental Baking Co. had a net sales figure of $74,315,476 for 26 weeks ending June 25. Sales for the same 1948 period were $78,330,616. Earnings were $2,562,649 and $3,199,615, respectively.

Standard Brands, Inc., reported net sales of $126,202,610 for the first six months of this year, which compares with $146,117,305 for the 1948 period. Net income came to $3,751,768, as against $5,019,241.

Stressing that its report for only part of a year should not necessarily be indicative of results on an annual basis, Armour and Company shows net sales of $926,895,368 for 26 weeks ending April 30. Sales in the same 1948 period totaled $888,208,663. This year's statement shows a loss of $6,512,634, against $1,756,131 for the same period last year.

Prepackagers Welcomed To Packaging Forum

Packaging Institute is making plans to play host to the First National Conference on Prepackaging, at its own 11th annual forum, October 24 to 26, at the Hotel Commodore, New York City. Arrangements being made by the Institute call for the prepackagers' meetings to run concurrently with the forum. The prepackers are also to be invited to all Institute sessions that may be of interest to them.

Stressing its timely theme, "Packaging for the Buyer's Market—Quality, Costs, Marketing," the forum will devote the first day to general sessions, covering general management and research problems. The remaining two days will be devoted to more specific problems, such as package design, specifications, rigid and flexible packaging, filling, labeling, handling and shipping. Particular stress will be placed, this year, on the management program.

Food Companies Cited For Annual Reports

From the 4,200 corporation annual reports for 1948 submitted in the Ninth Annual Survey, conducted by Weston Smith of *Financial World,* 13 packaged food manufacturing companies have qualified for "Highest Merit Award" citations. They are:

Beech-Nut Packing, California Packing Co., Deerfield Packing, General Foods Corp., Gerber Products Co., Hawaiian Pineapple Co., H. J. Heinz Co., Hunt Foods, Inc., Libby, McNeill & Libby, McCormick & Co., Minn. Valley Can. Co., Standard Brands, Stokely-Van Camp, Inc.

The stockholder reports of these companies have thus become candidates for the final judging, and one will be selected for a "Best of Industry" award and presented with a bronze "Oscar of Industry" at the *Financial World's* Annual Report Awards Banquet on October 31 in the Hotel Statler in New York. A year ago the 1947 annual report of General Foods Corp. won the trophy in this industrial classification.

Egg Quality Affected By Price Supports

Eighty percent of the firms surveyed recently by the Institute of American Poultry Industries reported that the government's 1948–49 egg support program, at 90 percent of parity, had an unfavorable effect on their quality egg marketing programs. These firms, located in the support buying areas, buy eggs directly from 118,723 producers.

According to this survey, the 90 percent support price has reduced premiums for top quality and decreased the number of producers willing to participate in quality programs offered by graded outlets.

Results of the survey have been forwarded to the Senate and House agriculture committees, in support of the stand taken by producer groups in favor of lower, flexible support levels for poultry and eggs.

"We hope the information obtained from this survey will help Congress steer clear of unsound price support legislation for poultry and eggs," commented Cliff D. Carpenter, president of the Institute, "for as long as high, rigid supports are continued, the hundreds of thousands of dollars industry and government have spent on quality improvement might as well be thrown away. It's high time this situation was corrected."

FTC Charges General Foods With R-P Act Violation

General Foods Corp. is being charged with violation of the Robinson-Patman Act in a complaint issued by the Federal Trade Commission. Alleged regional discrimination in pricing two of its products, Certo and Sure-Jell, on the West Coast forms the basis for FTC's complaint.

Specifically, FTC charges that in 1947, at a time when the corporation's established price for a case of Certo was $4.30, General Foods ordered its managers for the Seattle, San Francisco, Los Angeles and Salt Lake City districts to arrange "deals" whereby the product was sold at $3.18 per case. Similarly, says FTC, Sure-Jell was sold in these localities and in part of the Denver district at $2.57½ per case, while the established price over the country was $3.25.

Effect of the alleged price discriminations, the complaint continues, may be to substantially lessen competition between General Foods and its competitors in the sale of prepared pectin products, or "to tend to create a monopoly."

The complaint, dated July 25, gave General Foods 20 days in which to answer. In early August the corporation had not as yet prepared any statement for publication.

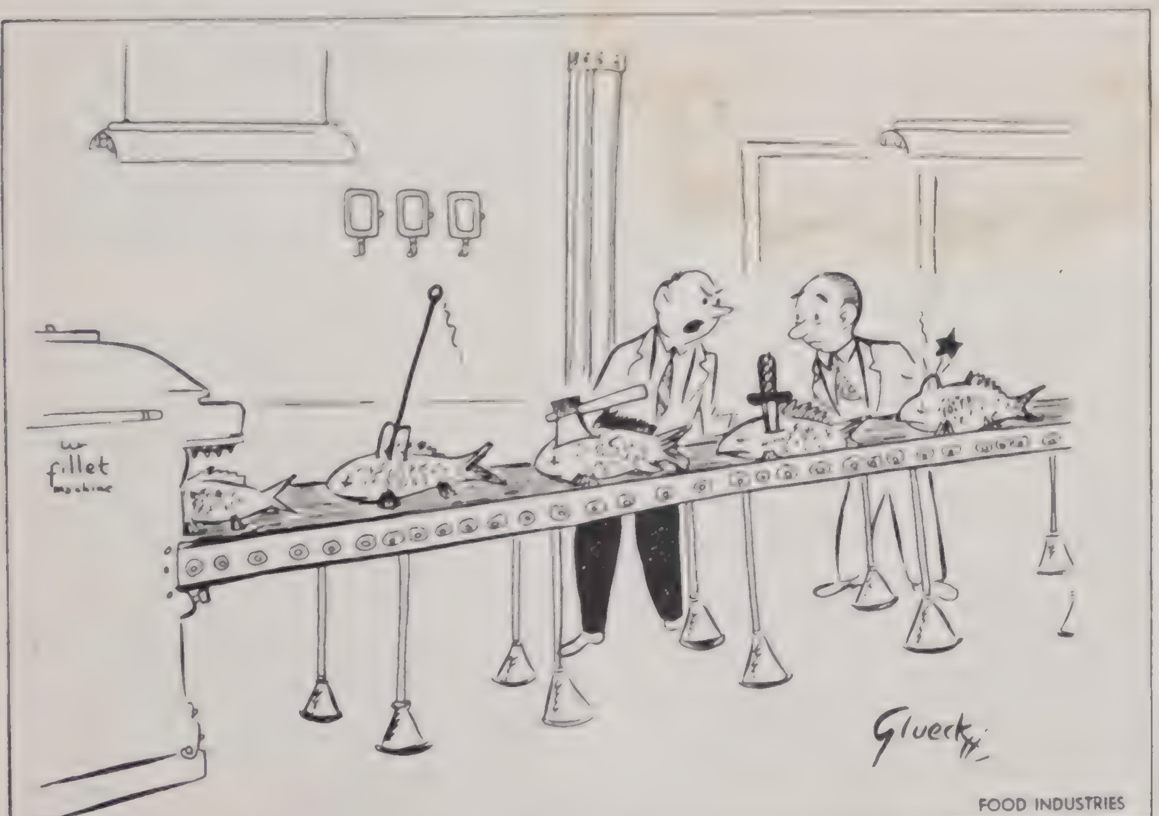
Food & Drug Subpenas

Subpena power may be given to the Federal Security Administrator for use in connection with the Federal Food, Drug, & Cosmetic Act.

A Congressional hearing on H.R. 4572, introduced by Congressman Keefe (Rep., Wis.), was held on July 13. Sections 301, 302, and 701 of the FD&C Act would be amended to give subpena power to "the Administrator or such officer or employee as he may designate . . . compelling the attendance of witnesses, and requiring the production of any books, papers, or other documents which he deems relevant or material to the inquiry."

It was admitted by a Food & Drug spokesman that cases where subpena power would have been useful have been few in number. Two industry witnesses, speaking for the Grocery Manufacturers of America and National Canners Association, also testified. They did not oppose the bill, but suggested that action be deferred pending further study by them and by Bar Association groups.

(Industry News Continued)



"WHERE THE DEVIL ARE WE GETTING THESE FISH?"

NIAGARA AEROPASS

*PATENTED

New Condenser Cuts Refrigeration Costs Saves Cooling Water

● The Niagara Aeropass Condenser cuts the cost of refrigeration by running compressors at lower head pressure, saving up to 35% of power.

The refrigerant gas passes thru two coils in an air stream. The first, "Duo-Pass"* dry coil, removes the superheat by air cooling and condenses oil vapor. The second, condensing coil, drenched by recirculated water spray, condenses by evaporation, transferring to the air 1,000 BTU for every pound of water evaporated and saving more than 95% of the water used by water-cooled condensers. This done at low temperature, no scale forms on condenser tubes to clog air passage.

Between the two coils is the "Oilout"*, which purges the system of crankcase oil and dirt, keeps it always at full capacity.

The "Balanced Wet Bulb"* control holds head pressure low, automatically giving the full benefits of power saving in cool weather and providing always full capacity for peak loads.

Niagara Aeropass design results from over fifteen years' experience condensing by air. It is completely trustworthy for year 'round operation. Users say, "It saves half the difficulties and labor of running a refrigeration plant."

Units range from 10 to 100 tons capacity. For full information ask for Bulletin 103.

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We offer a complete custom service from sketch to a finished product that is exclusively yours.

We also manufacture a complete line of round cans with stock designs for candies and cookies.

Let Empire quote on your requirements. We should get acquainted.

"No other container protects like the can"

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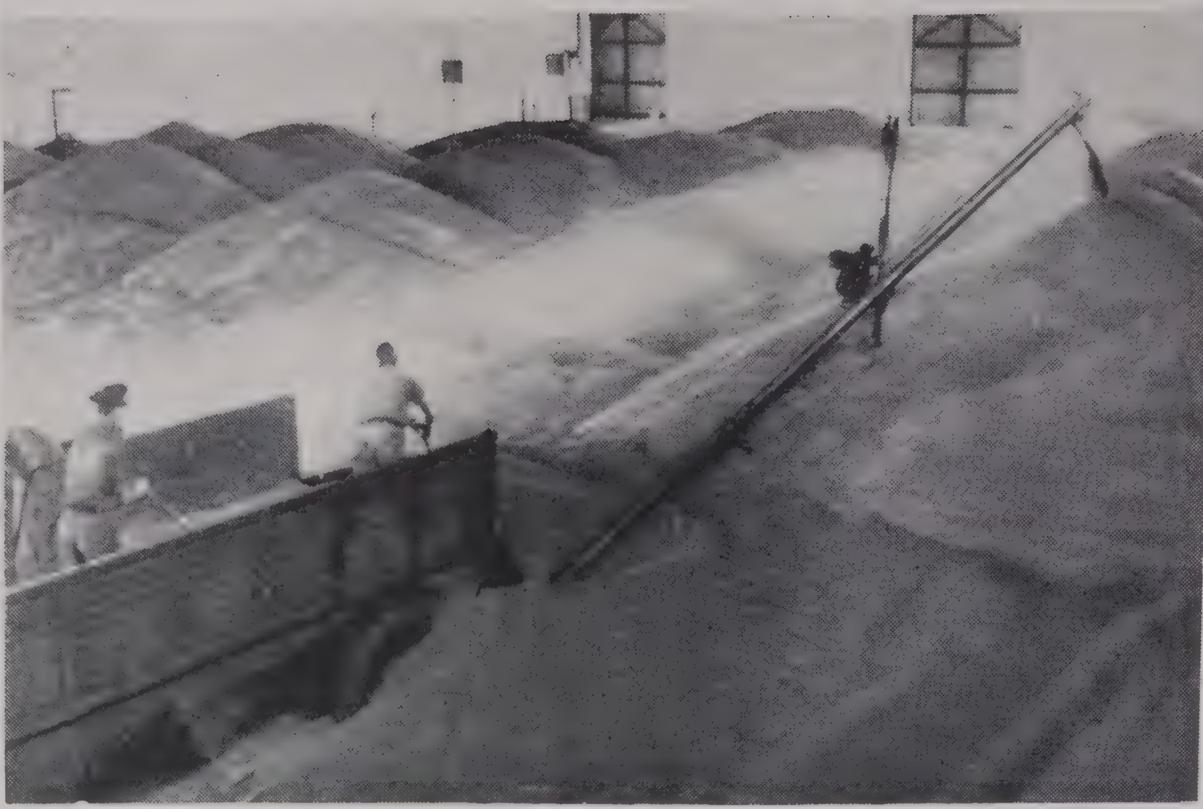
228 Ashford St. Brooklyn 7, N. Y.
APplegate 7-4701



Wide World

More Wheat Coming

A former Army Air Base hangar is put to good use in Kansas. Some 60,000 bu. of wheat have already been dumped in it for storage, with enough more to come to fill hangar to the rafters. Air ducts installed in the floor will help air the grain.

DISTRIBUTION

ICC Recommends Changes In Food Exemptions

Cost of truck shipping may be lowered this fall for a number of food products—as the result of a recommended decision recently handed down by an examiner of the Interstate Commerce Commission.

The decision spells out what commodities should be classified as "agricultural" and which "manufactured." Agricultural commodities, under the Interstate Commerce Act, may be shipped in trucks that are exempt from ICC's rate and route regulations. Truckers hauling manufactured products in interstate commerce have to file charged rates approved by ICC.

Among the products that would be changed from the "manufactured" to the "agricultural" classification, if the examiner's report is adopted by the Commission, are: Pasteurized milk, cream, and skim milk; shelled peanuts and other nuts; killed and picked poultry.

In ruling also on the so-called Harwood Case, the examiner decided that fruits and vegetables that have been washed and packaged in bags should not be classified as manufactured. Hence, shipments of such foods as spinach, kale, potatoes, cut-up vegetables, and tomatoes would also be exempt.

Here are other food commodities, as classified in the report:

Manufactured—Frozen and canned fruits and vegetables; frozen or dried eggs; frozen or dried egg yolks or albumin.

Agricultural—Fresh fruits, vegetables, and berries; whole wheat, rye, oats, barley, corn, rice; milk, cream, skim milk, standardized milk; pasteurized and frozen milk, cream and skim milk; homogenized milk and cream; vitamin D milk and skim milk; whole eggs and oiled eggs; shelled or unshelled peanuts and other nuts to which nothing has been added; poultry, alive, or killed, picked, drawn, cutup, frozen, or unfrozen.

British Dollar Shortage Cuts Food Imports

The British financial crisis—brought on by lack of dollars which in turn is caused by reduced sales of British products in the U. S.—means only one thing to U. S. food processors: Less export business.

So says the Department of Agriculture's Office of Foreign Agricultural Relations, in a report analyzing the impact of Britain's financial troubles on the U. S. farmer and food processor. Among the products to be hit hardest are fruits, vegetables, tobacco, cotton.

OFAR's experts see the situation like this: The United Kingdom has long been the most important market for U. S. food exports: lard, oranges, apples, and dried fruits. In 1948, the U. S. shipped only $35.4 million worth of foodstuffs to the U. K., compared with $117 million in 1947, and $98 million prewar.

Following the dollar crisis that developed in Britain in the summer of 1947, imports of foods to Britain from the U. S. were just about shut off completely. When ECA financing became available, our exports to England recovered somewhat during the latter months of 1948, and the first half of this year.

But, with the new crisis, the outlook for permanent restoration of the British market for U. S. processed and fresh foods is quite dark.

As a result of meetings between top British and U. S. government officials, it was agreed that the only solution is to be found (1) in Britain's earning more dollars by selling more goods in the U. S., and (2) in eventually knocking down the trade barriers that now surround the so-called "sterling area," that is, the nations in the British Commonwealth.

How these two goals are to be achieved is another matter. In the meantime, Britain—to protect her dwindling supply of dollars—was forced to curtail, by government edict, British buying of "non-essentials" in the U. S.

Coconut Oil Import Tax Back To Prewar Rate

The processing tax on coconut oil imported from sources other than the Philippine Islands is again raised to 5c. per lb.

This new rate, effective August 26, restores the tax advantage of 2c. per lb. that the Philippines enjoyed until Congress suspended it in 1942 because of the wartime shortage of fats and oils. In 1934, when the processing tax on imported coconut oil was first instituted, the rate on oil from the Philippines was 3c. per lb., and from all other sources 5c.

Continuation of the wartime suspension of this tax-preference was authorized in the Philippines Trade Act of 1946, so long as supplies of Philippine oil were insufficient to meet the U. S. demand.

Rice Packaging

A new method of packaging brown rice to prevent it from becoming rancid in storage has been developed by Louisiana State University biochemists. Employed are specially treated and sealed aluminum foil and kraft paper.

The development climaxes two years of research by Drs. Virginia Williams and E. A. Fieger. Both Vitamin B1 and niacin have been retained for one year in storage tests with the new method, it is reported.

(Industry News Continued)

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For Low Cost Lift and Carrying . . .

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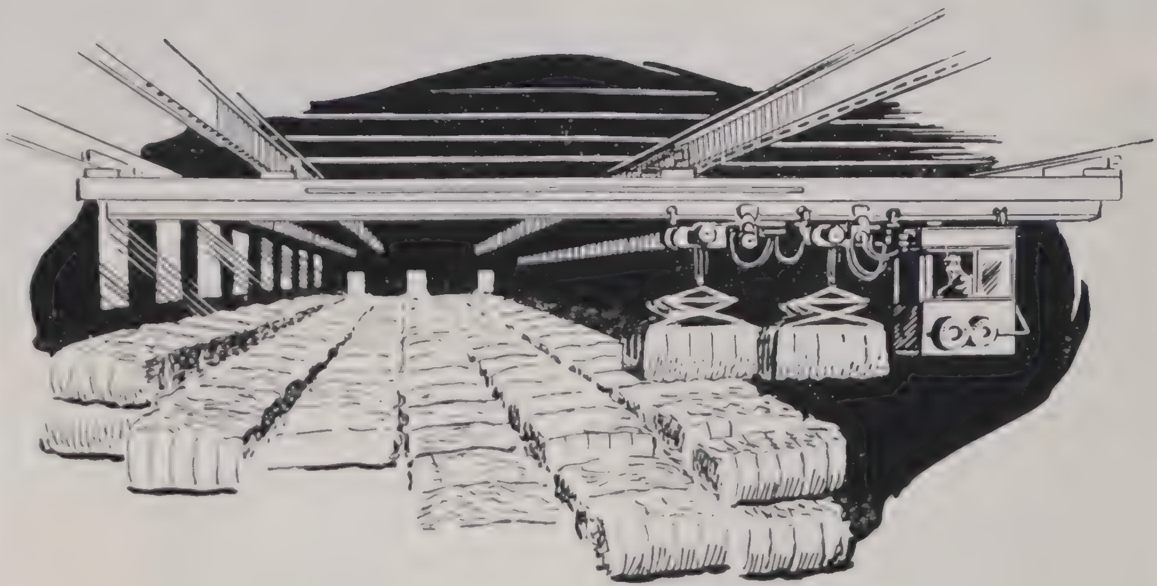

Stacking rolls of paper stock for storage with a "through the air" movement has lowered handling costs and produced more solid stacking in the storage area.

This warehouse picks up the loads *at the door* with overhead equipment, specially designed by Shepard Niles to operate with minimum headroom. No aisle space or turning radii are needed, every cubic foot of area is used for stacking "from the air."

This is one example of the service Shepard Niles specialists can supply to those with materials handling problems. There is economy in knowing where to leave off with one method and take up with the cheaper, faster, safer, "through the air" movement.

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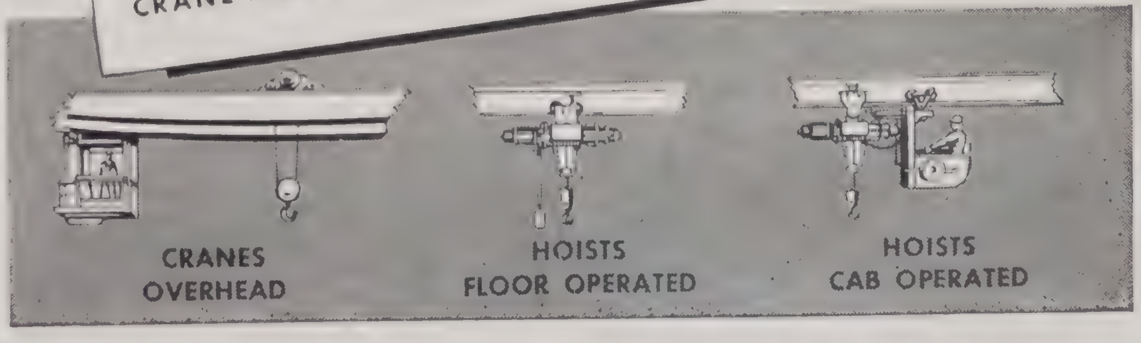

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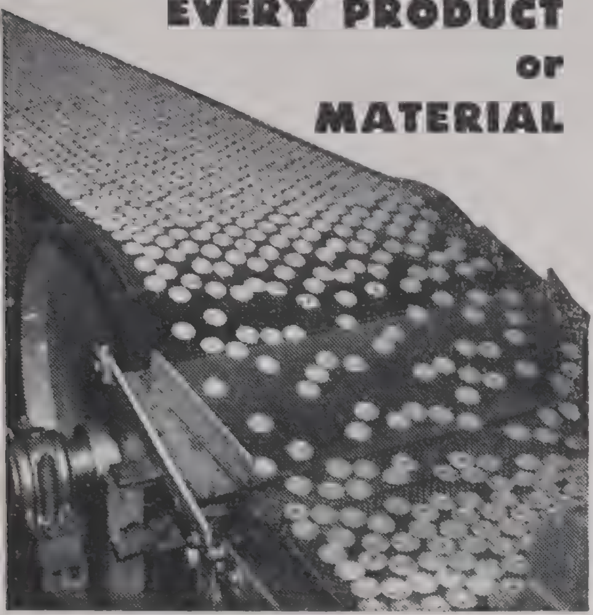

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Woven from any metal or alloy to any mesh or weave, Cambridge belts offer dependability, long life, freedom from time-wasting shutdowns for repairs. Among the specially designed Cambridge belts in service today are continuous conveyorized installations for baking, quenching, tempering, washing, drying, cooling and packaging.

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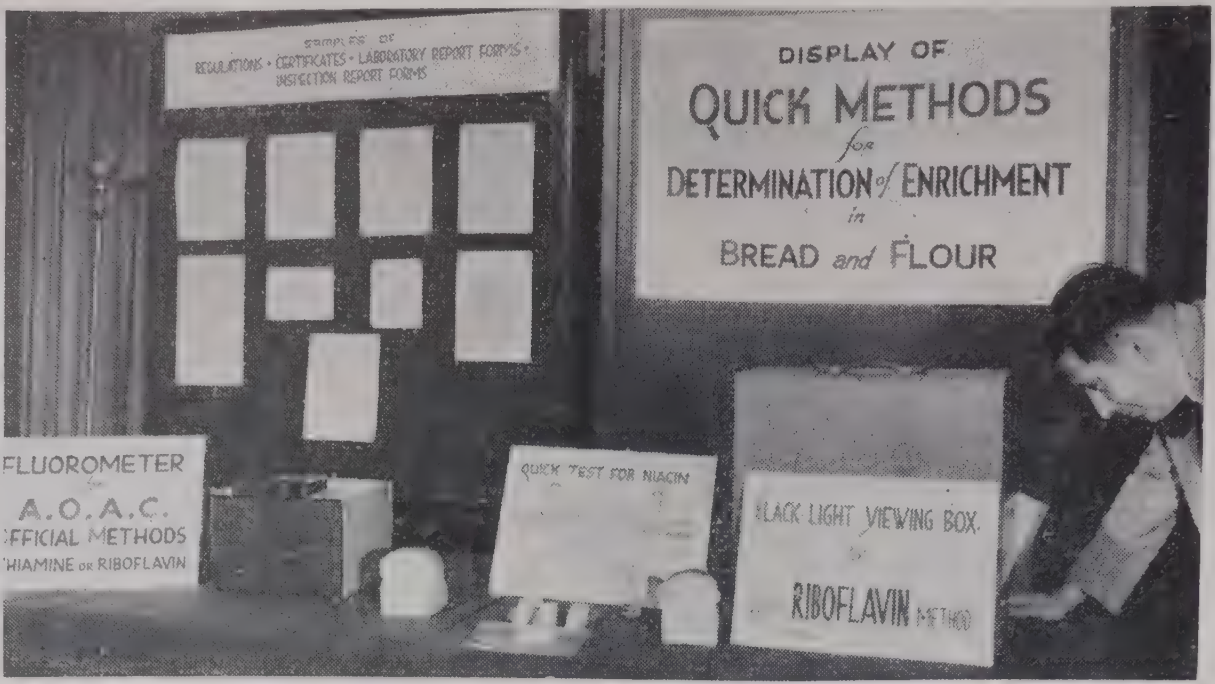

SAMPLES OF REGULATIONS • CERTIFICATES • LABORATORY REPORT FORMS • INSPECTION REPORT FORMS
DISPLAY OF QUICK METHODS for DETERMINATION of ENRICHMENT in BREAD and FLOUR
FLUOROMETER for A.O.A.C. OFFICIAL METHODS THIAMINE or RIBOFLAVIN
QUICK TEST FOR NIACIN
BLACK LIGHT VIEWING BOX for RIBOFLAVIN METHOD

Flour Enrichment Check

Millers' National Federation set up this display, at a recent conference of Food & Drug officials, to demonstrate that complicated and costly equipment is not required to make preliminary qualitative screening tests to determine whether bread and flour have been enriched. The 'black light' viewing box for determining presence of riboflavin is being examined here by Dr. Evan Wright.

Milk Marketing Study Launched by RMA

One of the most far-reaching studies of health and sanitary regulations affecting milk marketed throughout the country has been launched by the National Research Council with funds granted by the Department of Agriculture's Research & Marketing Act.

The study will cover fluid milk, cream, and skim milk for home consumption and for production of ice cream. The survey will include all state and city sanitary regulations that affect the flow of milk from the farmer on through the processing plants to the consumer.

Researchers will (1) collate the regulations, laws, and ordinances; (2) spell out the wide variation between different cities and states; (3) select typical areas for field study to determine the effect of the regulations; and (4) use laboratory and other research methods to evaluate the effect of the regulations on milk quality.

The project may take more than a year to complete. When the final report is out, however, it's expected to provide the basis for setting up model milk control laws and regulations.

The study grew out of the wartime experience of the armed services and the government in checking up on the sanitary regulations governing the milk supply going to military camps and industrial boomtowns.

Director of the study for the National Research Council is Dr. Arthur C. Dahlberg, professor of dairy industry, Cornell University.

First areas to be studied are cities with populations between 100,000 and 500,000, and their relationships with the states in which they are located.

Milk industry executives are hoping the report, when completed, may help the cause of simplified and more meaningful sanitary regulations for milk producers and processors.

Ban 'Superior' Claims In Meat Casing Ads

The Federal Trade Commission says that a meat processor cannot advertise that natural casings for sausages, wieners, and other meat products are superior to artificial casings made from cellulose or other substances.

FTC ordered Oppenheimer Casing Co., Inc., Chicago, to discontinue advertisements that make such claims for its natural casings, made from the intestines of animals. The company's advertisements, according to FTC, claimed that meat products in natural casings contain or retain more juices, flavor, proteins, or vitamin B_1 than those made with artificial casings.

Also included in FTC's order is the Natural Casing Institute, Chicago.

Alaskan Salmon Pack Behind Last Year

The salmon pack in Alaska was still lagging behind last year, in mid-July. At that time, 904,227 cases had been packed, compared to 1,585,000 by July 17 last year.

Fishermen say there's a small catch every five years—and the last one was in 1944. Packers blame both the bad season and the additional 42 hr. of closure each week—102 hr. instead of the usual 60 hr. a week.

More canneries were in operation in July—86 this year against 78 last year. But some of the big four-liners were operating only two lines; others expected to close before season's end.

Extremely light catches of salmon were also reported on the Columbia river. Only half the Astoria, Ore., fleet fished at all in July, and catches averaged only 100 lb., compared with averages of 500 lb. caught during previous years.

The British Columbia salmon pack is expected to total about 1,800,000 cases. Of this, some 900,000 cases will go to the domestic market and 410,000 cases to the United Kingdom. This will leave nearly 500,000 cases for export, but under tightened exchange restrictions.

USDA Proposes Broader Meat Plant Inspection

The Department of Agriculture is proposing to change federal meat grading provisions so as to require minimum inspection for federally graded meats not produced under federal inspection.

In brief, the new provisions would require non-federally inspected plants using federal grading to have before-and-after slaughter inspection of animals and carcasses by qualified veterinarians and to maintain certain sanitary standards in plant operations and on premises.

Many states, counties, and cities in which these plants are located have ample sanitary safeguards. The proposed new provisions are aimed at setting minimum inspection requirements for all non-federally inspected meats that are federally graded.

Retain Import Controls On Fats, Oils, Rice

Import controls on fats and oils, rice and rice products have been continued as of July 1. The controls were to have expired on June 30, but legislation approved July 1 enables the Department of Agriculture to continue through June 30, 1950 the controls that were under War Food Order 63. This order has been redesignated as "Agriculture—Import Order."

The fats and oils and oil-bearing materials under import control include flaxseed, linseed oil, peanuts and oil, cottonseed oil, olive oil, sunflower seed and oil, butter, lard, tallow, fatty acids, combinations and mixtures of vegetable and animal oils, palm oil, oleo oil and stearine, and soap and soap powder. Petroleum and petroleum products are not under import control.

(Industry News Continued)

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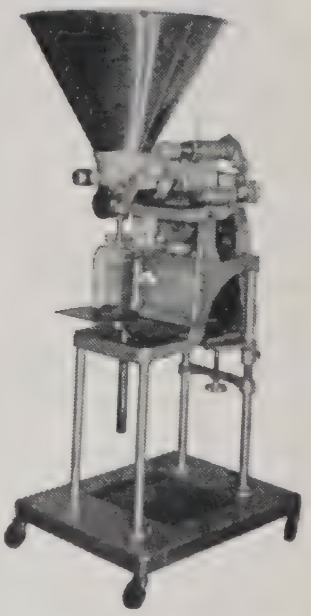

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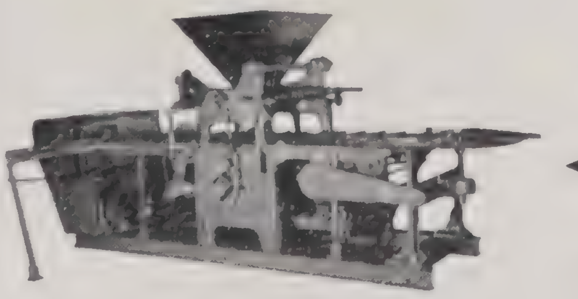

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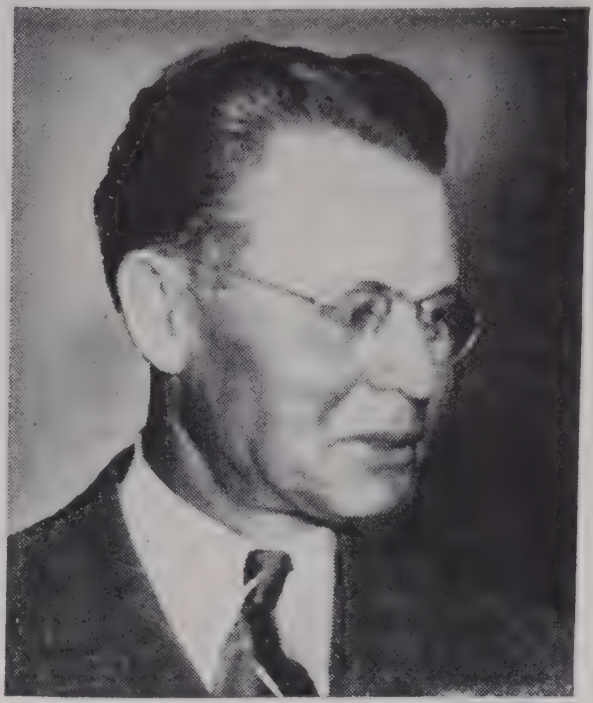

Wide World

Assistant Secretary

Knox T. Hutchinson is the new Assistant Secretary of Agriculture. Mr. Hutchinson operates a 600 acre farm near Murfreesboro, Tenn.

PROCESSING

USDA Devises New Method To Can Orange Juice

Orange juice treated by a new process and packed in cans, is being distributed in distant markets without loss of flavor or other qualities, according to the Department of Agriculture. The process, developed by Bureau of Agricultural & Industrial Chemistry researchers at Pasadena, Calif., working in cooperation with citrus processors, has resulted in the retention of top quality juice up to three weeks from the time of processing.

The method involves careful reaming of the fruit so that very little peel oil gets into the juice. The juice is then quickly chilled to 30 deg. F. and kept at this temperature until used.

Carload lots are said to have been successfully shipped from Los Angeles to New York. Ten plants are now using the process in California with production last year coming to almost 2,500,000 gal. A large part of the output is being shipped by refrigerated truck to consumers within a radius of 500 mi.

Cannery Waste Fermented By Continuous Process

A continuous fermentation process for converting the sugar in fruit cannery waste into industrial alcohol is reported in the July bulletin of the Washington State College, Division of Industrial Services. The report is based on research carried on over a two-year period by Stuart L. Adams, who has been on leave from Joseph E. Seagram & Sons. Inc.

Sugar in pear waste, according to the report, has been converted with a 90 percent efficiency. Dr. Adams studied the fermentation characteristics of peach, apple and cherry wastes as well as maraschino cherry brine, along with pear wastes, before deciding upon the last named as the most suitable material.

When supplemented by addition of a small amount of nitrogen in the form of ammonium sulphate, urea or ammonium carbonate, it can be fermented continuously in a 10-hr. cycle. Cost of producing the alcohol commercially by this process is estimated at 32c. per wine gallon.

Agriculturists believe that the dried fermentation residue can be used as a low protein ration supplement for feed.

In his report, Dr. Adams gives a cost estimate for a mobile unit designed to process 50 tons of waste per day and produce more than 500 wine gal. of 190 proof ethyl alcohol.

No "Sugar Added" Standard For Frozen Orange Juice

Processors of frozen concentrated orange juice who market a "sugar added" product cannot qualify for a Grade A rating under the department's voluntary grade standard, which is now effective.

Reason: The standard makes no provision for any ingredient other than fresh orange juice.

Promulgation of this kind of standard is in line with the department's desire to promote the consumption of citrus products. At the time the proposed standard was being discussed, agriculture officials underscored the fact that the sugar added concentrate reduces the number of oranges required by one-fourth. Three boxes of oranges, with sugar added, will fill the same number of cans as four boxes of oranges without sugar.

Department officials noted that this situation raised two issues: 1. The question of adulteration, or deception of the consumer—since sugar is so much cheaper than the concentrated orange juice; and 2, the question of whether the sugar-added product, because of its lower cost per can, might cut deeply into the demand for the pure concentrate.

Objections were raised to the issuance of the standard with no provision for any additional ingredient. But the department is merely "studying" the situation, with no action one way or the other anticipated.

(Industry News Continued)

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Also still in the discussion stage is the question of the department's permitting the use of its frozen concentrate process only by processors who market the pure product. The question is should the license be available only to packers who abide by the "voluntary" grade standard? Such a ruling, if enforced, would effectively ban the production of the sugar added product.

In the meantime, production of the concentrate keeps skyrocketing. Florida processors marketed 10,000,000 gal. in this form during the 1948-49 season, compared with 2,000,000 gal. during 1947-48. Already, two Florida citrus packers have announced plans which, in themselves, would result in the production of as much concentrate as all the total Forida production from last season's crop.

California production ran to about 500,000 gal. last winter, and will probably be about the same this coming season. Reason for the lack of expansion is simply that the California citrus growers are able to market their reduced crop without having to expand production of the concentrate.

USDA Grade Standards

At least four actions have taken place in the grade standards field since last month's resumé. Shell eggs, canned carrots, dried figs, and meat grading and certification were the subjects of those official actions.

Shell eggs are now covered by U. S. specifications and weight classes for wholesale grades, as expected (see page 149, March FOOD INDUSTRIES). Printing of the new grades was on page 3795 of the July 9 *Federal Register*.

Canned carrots, for which revised U. S. grade standards were expected (see page 150, April FOOD INDUSTRIES) are now covered by the third issue of such standards, effective on the 26th of August. These standards were printed on page 4662 of the July 27 *Federal Register.*

Dried figs have also been formally revised. Notice of this proposed revision was given on page 116 of the June issue of FOOD INDUSTRIES. The final standards, as to be put into effect on August 28, were printed on page 4739 of the July 29 *Federal Register.*

Meats, prepared meats and *meat products,* when graded and certified by Production & Marketing Administration of U. S. Department of Agriculture, must be handled in accordance with instructions regarding inspection requirements, printed on page 3919 of the July 15 *Federal Register.*

No adverse comments were received within the 15 days allotted from the

Wide World

Herring Nets Mended

Up in Thomaston, Me., where they aren't supposed to know much about anything other than lobster and other seafoods, they picked this young lady to represent the town in the Miss Maine Seafood Queen contest. It proves that they haven't confined their larnin' to lobster and s. f.

---

printing of this proposal. Formal promulgation of a final order was expected in mid-August, without change from the July 15 printing.

F&DA Food Standards

Canned pineapple and *pineapple juice* may be the subject of the next major food standards proceeding at Food & Drug Administration. An application from the Pineapple Research Institute has been received by F&DA. However, no indication as to timing of the hearing was available in early August.

Canned mushroom standards of identity may be amended to permit use of ascorbic acid as an additional optional ingredient in the same manner that citric acid is now permitted. The purpose of such use is to prevent color change after canning. Announcement of an August 18 hearing was on page 3922 of the July 15 *Federal Register*.

Bread standards hearing continued in August, but optimists were predicting that final adjournment would take place by Labor Day. Oxidizing agents were discussed during the latter part of July, and a few miscellaneous items were expected in early August. Additional data on the chemical emulsifiers were expected in mid-August, to round out the hearing shortly thereafter.

Regarded by some as a persuasive

(Industry News Continued)

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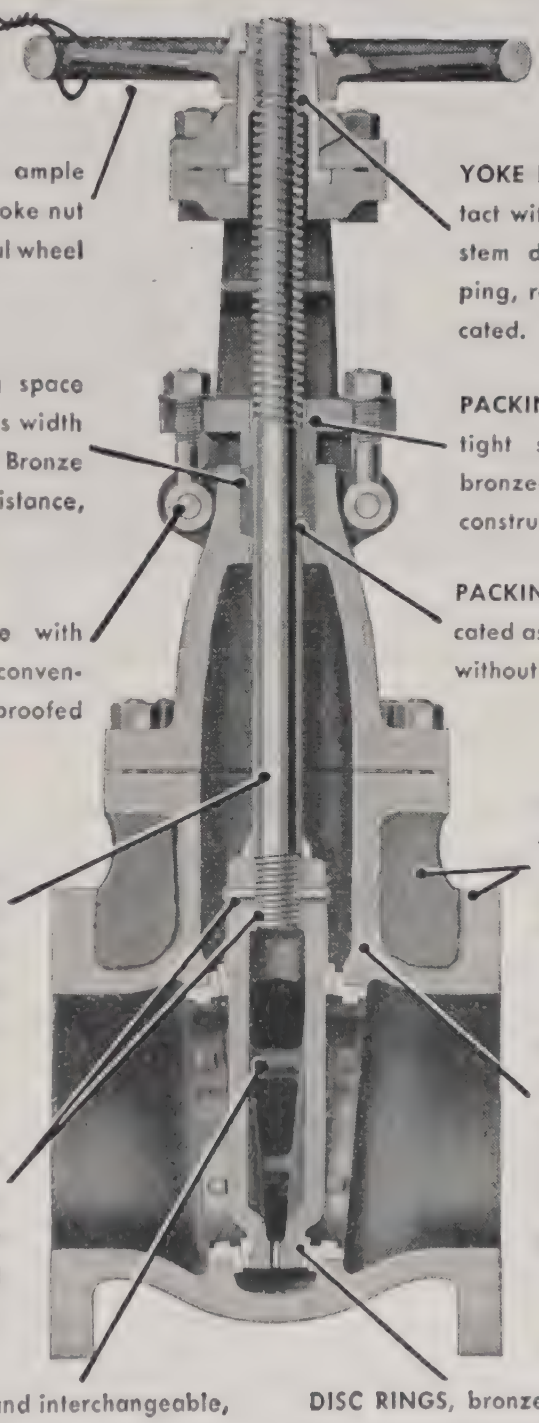

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STEM, rolled bronze, liberal diameter, for high tensile and torsional strength. Top seat collar permits repacking under pressure.

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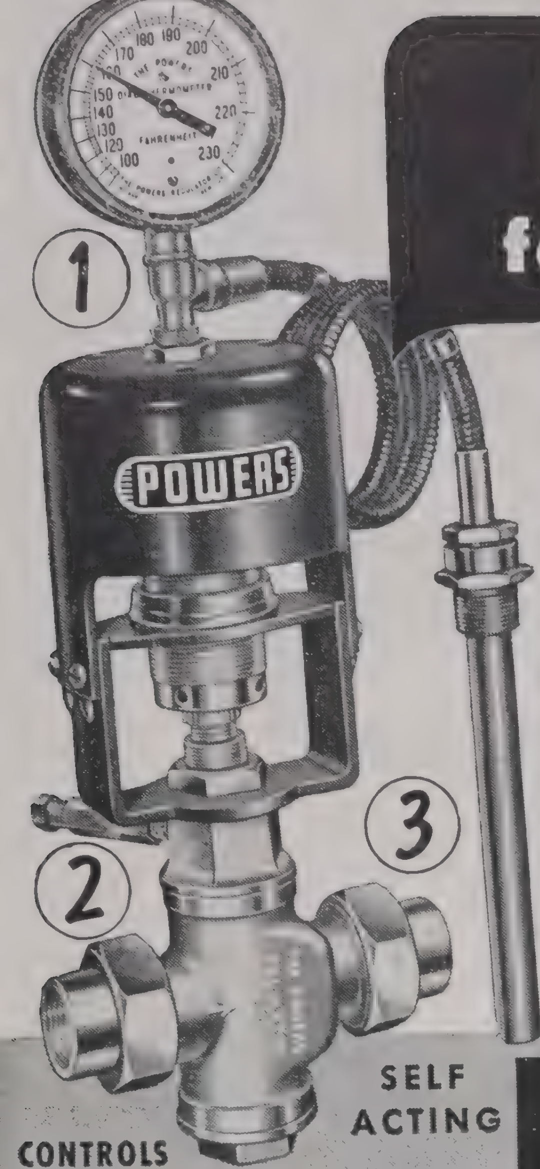

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Wide World

Movie Bait

Popcorn grows mighty tall on this field near Macon, Ill. It measures 12 ft. 4 in. and is being grown by 16-year-old Charles Lancaster, whose father is here looking over (figuratively) the stuff.

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delay in the adoption of chemical emulsifiers as optional ingredients of bread was a pair of resolutions introduced into the bread standards record shortly before a recess in June. These resolutions are quoted below:

1. By Gerard R. Williams, Chairman of the American Bakers Association Bread Standards Advisory Committee. "In view of statements in this proceeding by representatives of the American Medical Association, the National Research Council, and the statements of other recognized authorities, that toxicological evidence presently available on certain emulsifiers is inconclusive, the American Bakers Association recommends that polyoxyethylene monostearate and related compounds, sorbitol mono-stearate and related compounds, and any other modified esters of fat-forming fatty acids not found in natural products, *not* be included as optional ingredients in the bread standards.

"It is the further recommendation and belief of the American Bakers Association that from a functional viewpoint the effects of some of the above-mentioned emulsifiers are useful, and that when and if adequate toxicological information is available, then the aforementioned emulsifiers should be considered for inclusion as optional ingredients."

2. By William A. Quinlan, Counsel for Associated Retail Bakers of America: "The Associated Retail Bakers of America joins in the recommendation that chemical bread softeners, such as the polyoxyethylene monostearates, sorbitol monostearates and related compounds, not be included in the standards.

"The Associated Retail Bakers of America does not join in the second part of the recommendation stated by Mr. Williams—the part to the effect that such materials should be considered for inclusion as optional ingredients if and when adequate toxicological information is available."

Toxicity of the chemical emulsifiers of the type discussed at greatest length (Sta-Soft, Myrj 45, etc.) apparently is not regarded as serious by Food & Drug Administration. No testimony was offered by the pharmacology division of F&DA on this subject up to the time of publication of this issue.

At least one spokesman of this F&DA division stated that he personally did not regard these emulsifiers as "toxic." He pointed out, however, that the effect on fat metabolism and cholesterol metabolism, when such emulsifiers were added to a normal diet, posed biochemical questions which he would like to see answered. From six months to a year might be required to answer such questions satisfactorily under normal circumstances.

Cheese. Extension of the period in which comments would be received on the tentative order for standards of identity of cheeses was announced in the *Federal Register* of July 15, on page 3921. August 21 was set as the new date by which written exceptions to the tentative order might be filed.

Tentative orders were still awaited on *salad dressings, frozen fruit,* and *canned corn.* No prediction as to their appearance will be ventured, since the first two are already long overdue. The canned corn order is a simple amendment of an existing standard.

Other Foods Discussed

Informal meetings of the food standards committee were held late in June to discuss *canned tunafish, canned* and *frozen asparagus,* and *frozen peas.* Standards of quality of the other three commodities were taken up. Standards of fill of container for canned tunafish also were discussed.

"Constructive suggestions" were received by F&DA Food Standards Committee from those who attended the meetings. As a result of these sessions, announcements of formal hearings may be made some time in the next few months.

Also in the future are possible hearings on *chemical spray residues* on various foods, and standards of identity for *ice cream.* The former may not come until winter. The ice cream hearing may be announced for early fall.

Canned oyster standards of identity and fill of container have been involved in litigation for many months. Willapoint Oysters on the Pacific Coast objected to the standards as published

(Industry News Continued)

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MUNDET CORK INSULATION

in the Mar. 13, 1948, *Federal Register*. The 9th Circuit Court of Appeals sustained the Food & Drug position on fill of container, but reversed the F&DA order that West Coast oysters be designated "Pacific Oysters", in contrast to the Eastern term "Oysters", or "Cove Oysters".

A petition for rehearing was denied by the Court in early June. The Willapoint Co. has indicated that it will appeal to the Supreme Court at its next term, beginning next month (October). Final decision will probably not be forthcoming until late fall.

Hormones Not Recommended For Canning Tomatoes

At present, hormone treatment is not recommended for the canning tomato crop, say University of California experts. The main advantage of hormone set of tomato blossom, say P. A. Monges and L. K. Mann of the Davis experiment station, is to increase early set and thus assure early maturity. With canning tomatoes, earliness is not usually important, because the price of the crop is more stable than that of market tomatoes.

A disadvantage of the treatment is the danger of reducing total yields. While this may be avoided by careful application of the spray, hand spraying of canning tomato fields is impractical. With 4-CPA (4-chlorophenoxyacetic acid) whole plant spraying usually causes too much plant damage and at the same time is not as effective in setting fruit as cluster spraying.

Plant damage, sunburn, the accentuation of puffiness and blossom-end rot, the persistent green color of the jelly-like material in the seed cavity, the production of rough fruit from the setting of deformed flowers—all tend to offset the advantages of an early start on the tomato canning season and the 10 to 50 percent increase in size over naturally set fruit.

Shift Research Heads In USDA Shakeup

With appointment of a new Assistant Secretary of Agriculture to coordinate all the department's marketing activities—including research in marketing—Secretary of Agriculture Brannan has begun a reorganization of some of the department's most important activities.

The new Brannan assistant is Knox T. Hutchinson, Tennessee farmer and agriculture professor, who has been active in rural electrification, the Tennessee Grange, and cotton and tobacco grower groups. He runs a 550-acre diversified farm near Murfreesboro, Tenn.

Research & Marketing—The Department of Agriculture research activity most directly useful to food processors—also has a new boss, who reports to Hutchinson. The new administrator of RMA is P. V. Cardon, who also retains his position as the administrator of the Agricultural Research Administration, in charge of the five old-line research bureaus of the department.

E. A. Meyer, first administrator of the Act, resigned to return to private industry after two years as RMA chief, during which he directed the spending of some $22,000,000 appropriated by Congress to expand market for farm crops and increase the efficiency of marketing them.

Already the third year's RMA funds—$19,000,000—have largely been allocated. (See page 119.)

Farm bloc Congressmen will be sure to give this reorganization a careful scrutiny. Ever since the Research and Marketing Act was created, Senators and Representatives have frequently criticized the allocation of RMA appropriations to ARA research bureaus. Reason: They feared that RMA money might be diverted into so-called "production" research, instead of going to projects designed to expand the market for farm crops.

Fat-Free Milk

Bowman Dairy Co., Chicago, has developed a new fat free milk. The new product is Grade A milk from which the fat has been removed and to which milk solids have been added. The solids increase the protein, mineral and lactose content by 33 percent and the milk has 2,000 USP units of Vitamin A and 400 USP units of Vitamin D added to each quart. It meets the requirements of individuals who must have fat-free diets and nourishing food.

World News

Grain Sorghums Promise More Meat for Britain

MELBOURNE—While British Overseas Food Corp.'s celebrated East African groundnut scheme still produces more news than peanuts, BOFC's Queensland hog-fattening project already foreshadows a new era of ham-and-egg breakfasts for the British.

It is not hogs the corporation is raising in Queensland—not yet. For the time being it is busy with grain sorghum, one of the four main varieties

(Industry News Continued)

How SPEED helped catch "bugs" in the lacquer

Final finish on pianos mysteriously going "sour." Production halted. Lab needed X-ray diffraction camera to identify impurity. At 9 A.M., 10-lb. camera Air Expressed from 1100 miles away, delivered by 4 P.M. *same day*. Cost, only $3.58. Company uses Air Express as routine method to get supplies fast, keep inventory low.

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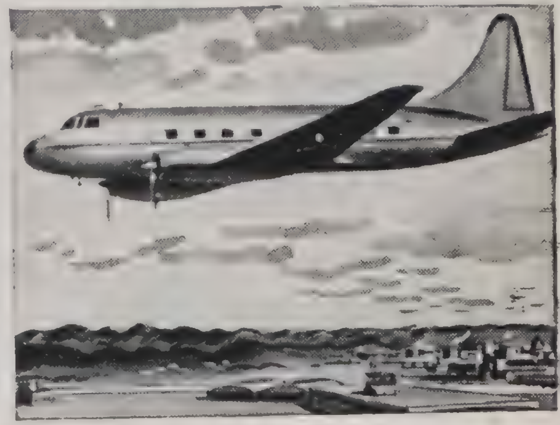

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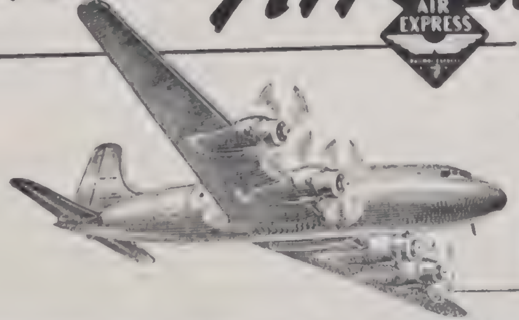

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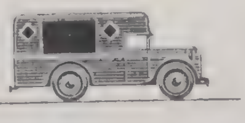

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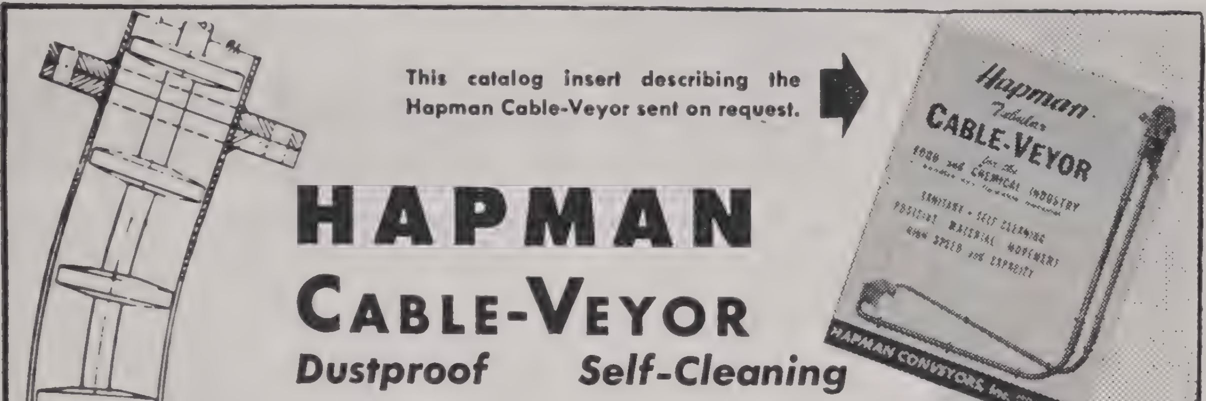
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of the sorghum grass. Sorghum was cultivated in Egypt 4,000 years ago. In Queensland it got established in a big way just over a year ago when BOFC set up an Australian subsidiary, Queensland British Food Corp., and started to sow 30,000 acres at Peak Downs, in the center of the state.

By the middle of last May, the farm was covered with the first brick-red carpet of ripening sorghum heads. In June, a fleet of tractor-drawn headers cut wide swathes through the shoulder-high stalks. The first shipments of the first year's experimental 1,000,000-bu. harvest are ready to leave the ports of Gladstone and Rockhampton for hog farms in Britain.

Encouraged by the complete success of the first crop, Queensland British Food Corp. is now going ahead with the full project. Ultimately it hopes to harvest 7,500,000 bu. a year and to raise 500,000 pigs on the Queensland seaboard. They will yield 75,000,000 lb. of meat for shipment to England. Freightwise, this offers advantages over the present method of exporting the grain. Next year, both grain and meat will be shipped to England.

The pithy sorghum stems make good cattle fodder and BOFC has not lost sight of this fact. Recently, it bought 10,000 head of cattle in the Northern Territory to fatten them on the stalks. The carcasses will also be shipped to England.

Brazilians Would Like More Brewed Coffee

Rio de Janeiro—Brazilians drink less coffee per capita than Americans, but would probably drink a lot more if they could get it.

Americans average 9 kg. (just under 20 lb.) per year, while Brazilians, who raise the bulk of the world's coffee, use only 4.97 kg. per capita, says José de Queiroz Teles, superintendent of the general warehouses of the state of São Paulo.

What makes the Brazilian average so low is shortage of transportation to states far from the coffee-growing belt, plus lower individual purchasing power in many of them.

Larger Peas Via X-Rays

Stockholm—A method of growing larger peas than the standard type by means of X-ray irradiation has been discovered by a Swedish scientist, Olov Gelin. According to a statement by Dr. Gelin in *Stockholms-Tidningen,* the peas increased 20 percent in size and 15 percent in yield after being bombarded by 15,000 X-ray units.

(Industry News Continued)

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- V6 Victor dicalcium phosphate . . . mineral enrichment in graham crackers. ☐
- V7 Victor sodium acid pyrophosphate and monocalcium phosphate . . . leavening acid ingredients in prepared mixes for cakes. ☐
- V8 Victor disodium phosphate . . . emulsifier for process cheese. ☐

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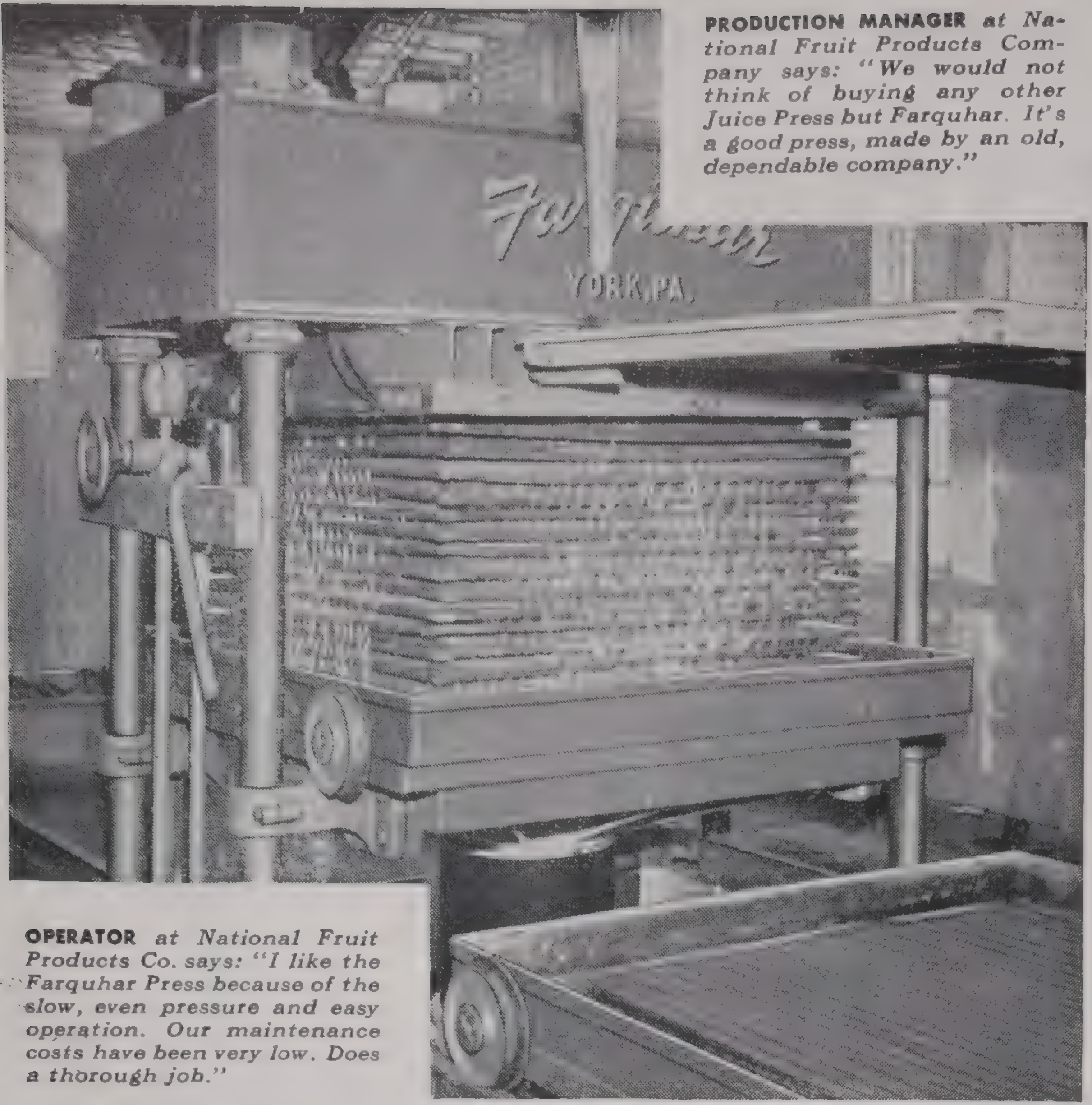

PRODUCTION MANAGER *at National Fruit Products Company says: "We would not think of buying any other Juice Press but Farquhar. It's a good press, made by an old, dependable company."*

OPERATOR *at National Fruit Products Co. says: "I like the Farquhar Press because of the slow, even pressure and easy operation. Our maintenance costs have been very low. Does a thorough job."*

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Schedule of Events

September

6- 8—American Soybean Assn., 29th annual convention; Hotel Nicollet, Minneapolis.
8- 9—Cornell University, dairy industry conference; Ithaca, N. Y.
12-17—Pennsylvania State College, short course in testing milk, cream, and other dairy products; School of Agriculture, State College, Pa.

October

4- 6—Society of Industrial Packaging & Materials Handling Engineers, 4th annual exposition; Convention Hall, Detroit.
9-12—Master Brewers Assn. of America, annual convention; Los Angeles.
12-15—National Assn. of Food Chains, 16th annual meeting, Statler and Mayflower Hotels, Washington, D. C.
15-20—American Bakers Assn., annual convention and baking industry exposition; Municipal Auditorium, Atlantic City.
20-22—International Assn. of Milk & Food Sanitarians, 36th annual convention; Deschler-Wallick Hotel, Columbus, Ohio.
24-26—Packaging Institute, 11th annual forum; Commodore Hotel, New York City.
24-26—National Assn. of Popcorn Manufacturers, international convention and exposition; Palmer House, Chicago.
24-28—National Safety Council, 37th national congress; Stevens, Congress, and Morrison Hotels, Chicago.
26-28—Milk Industries Foundation, annual convention; Ambassador Hotel, Los Angeles.
26-28—International Assn. of Ice Cream Manufacturers, 45th annual convention; Biltmore Hotel, Los Angeles.
28—National Pickle Packers Assn., annual meeting, Sheraton Hotel, Chicago.
31-Nov. 2—American Oil Chemists Society, fall meeting; Edgewater Beach Hotel, Chicago.
31-Nov. 3—Supermarket Institute, mid-year meeting; Hotel Cavalier, Virginia Beach, Va.

November

1- 5—California Section, American Chemical Society, Pacific chemical exposition and industrial conferences; Civic Auditorium, San Francisco.
8- 9—American Butter Institute, 41st annual meeting; Drake Hotel, Chicago.
13-17—Vegetable Growers Assn. of America, 41st annual convention; Claypool Hotel, Indianapolis.
14-16—Grocery Manufacturers of America, 41st annual meeting, Waldorf-Astoria, New York City.
14-17—American Bottlers of Carbonated Beverages, 31st annual convention and exposition; Convention Hall, Detroit.
14-18—Refrigeration Equipment Manufacturers Assn., 6th all-industry refrigeration and air-conditioning exposition, Auditorium, Atlantic City.
16-18—Texas Technological College, dairy manufacturing short course; Dept. of Dairy Manufacture, Lubbock, Tex.
27-30—National Automatic Merchandising Assn. convention and exhibit; Auditorium, Atlantic City.
28-Dec. 3—Chemical Industries, 22nd exposition, Grand Central Palace, New York City.

—*End*

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NEW FRESH FRUIT SPREADS. A new heatless process, utilizing glycerine, is claimed to produce fruit spreads which retain the natural flavor, aroma, and color of the fresh fruit. (F-7)

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FOR BETTER CAKES the use of frozen eggs processed with glycerine is suggested. Cakes made with eggs of this type are alleged to possess a smoother, firmer, more even grain than cakes made with either fresh eggs or non-glycerinated frozen eggs. (F-8)

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A NEW TYPE SAUSAGE COATING, claimed to be prepared from calcium carbonate, glycerine, gelatin and water, is said to prevent discoloration or browning of the outer meat surface and to maintain the original color of the meat throughout. (F-9)

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☐ F-7 ☐ F-8 ☐ F-9 ☐ F-10

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Changes in Food Supplies

Production

Creamery Butter production, in June, was estimated at 155,325,000 lb., a contra-seasonal decline of 2 percent under May. Last year the May-June advance was 4 percent, and the recent five-year average gain was 6 percent. June output, however, was 12 percent larger than June, 1948, though 6 percent under the five-year average for the month.

Ice Cream output in June, estimated at 65,665,000 gal., was 1 percent above June, 1948, and 7 percent more than the five-year average. The May-June increase was 17 percent, against 20 percent for both last year and the five-year average for the month. Production for the first six months is 2 percent under the same 1948 period.

American Cheese production declined between May and June—the second time on record. Estimated at 112,875,000 lb., output in June was 2 percent under May. This is in contrast to a 4 percent May-June gain a year ago, and a 6 percent increase in the five-year average. Production, however, was 6 percent larger than June, 1948, and 5 percent above the five-year average for June.

Eggs—liquid, frozen and dried—held close to the previous year in June production. Liquid eggs totaled 78,720,000 lb., compared with 77,941,000 lb. Frozen eggs came to 49,534,000 lb., against 48,898,000 lb. Dried eggs dropped to 7,640,000 lb. from 9,082,000 lb.

Materials

Truck Crop acreage for processing as estimated in July, along with the 1948 acreage and the 1938-1947 average was: Snap beans, 115,530...100,530...114,430; green peas, 412,220...415,000...423,280; lima beans, 103,820...88,780...65,660; beets, 17,500...13,800...15,930; cabbage (contract), 9,750. . .9,420. . .9,870; sweet corn, 469,900... 493,700... 462,290; cucumbers, 143,500...139,200...111,400; pimientos, 21,000...14,300...13,840; tomatoes, 364,220...411,710......520,880.

Chicks, hatched in commercial hatcheries in June, totaled 111,670,000, which was 20 percent more than were produced in June, 1948, but 9 percent below the recent five-year average for June. Production for the first six months of 1949 was 25 percent ahead of last year and the third largest output of record for this period.

Stocks and Storage

Canned Vegetable stocks in canners' hands July 1, as compiled by the National Canners Association, were:

	Actual Cases	
	1948–49	1947–48
Sweet corn......	4,955,886	559,886
Wax and green beans........	321,031	218,582
Beets...........	64,712	222,516
Carrots..........	718,573	67,404
Tomatoes.......	2,718,555	1,949,713
Tomato juice....	5,740,779	3,578,479
Tomato catsup..	6,346,425	3,572,534
	Dozens of Cans	
Baby food......	41,792,000	36,204,000

Frozen Fish and Shellfish held in storage July 1 totaled 112,229,347 lb., a sizable increase over the 100,536,821 lb. held on the same date a year ago.

Cooler occupancy in public warehouses was down to 52 percent on July 1, 22 points under the 1944–1948 average for that date and the lowest for the season since records have been compiled.

Freezer space at 62 percent on July 1, was down 16 points from the average.

Indexes

The commodity index for foods, compiled by the New York *Journal of Commerce*, stood at 182.9 for the week ending August 13. A week earlier it was 182.7, for July, 179.9, while for August 1948, it was 212.0.

Business Week's index of business activity stood at 181.9 for the week ending August 6. This compares with 181.2 for the previous week, 178.8 a month earlier, and 194.7 a year earlier.

CONSTRUCTION

	Pending (thousands)	Total Awarded August (thousands)	Total Awarded 1949 (thousands)
Bakery...............	$168	$300	$4,931
Beverages...........	529	......	10,843
Canning and Preserving...............	......	......	115
Cold Storage.........	......	......	1,883
Confectionery........	......	......	1,008
Grain Mill Products..	2,500	68	17,131
Ice, Manufactured....	150	......	75
Meats and Meat Products..............	850	......	7,314
Milk Products.......	663	......	3,160
Miscellaneous........	1,771	450	10,692
	$6,631	$818	$57,15

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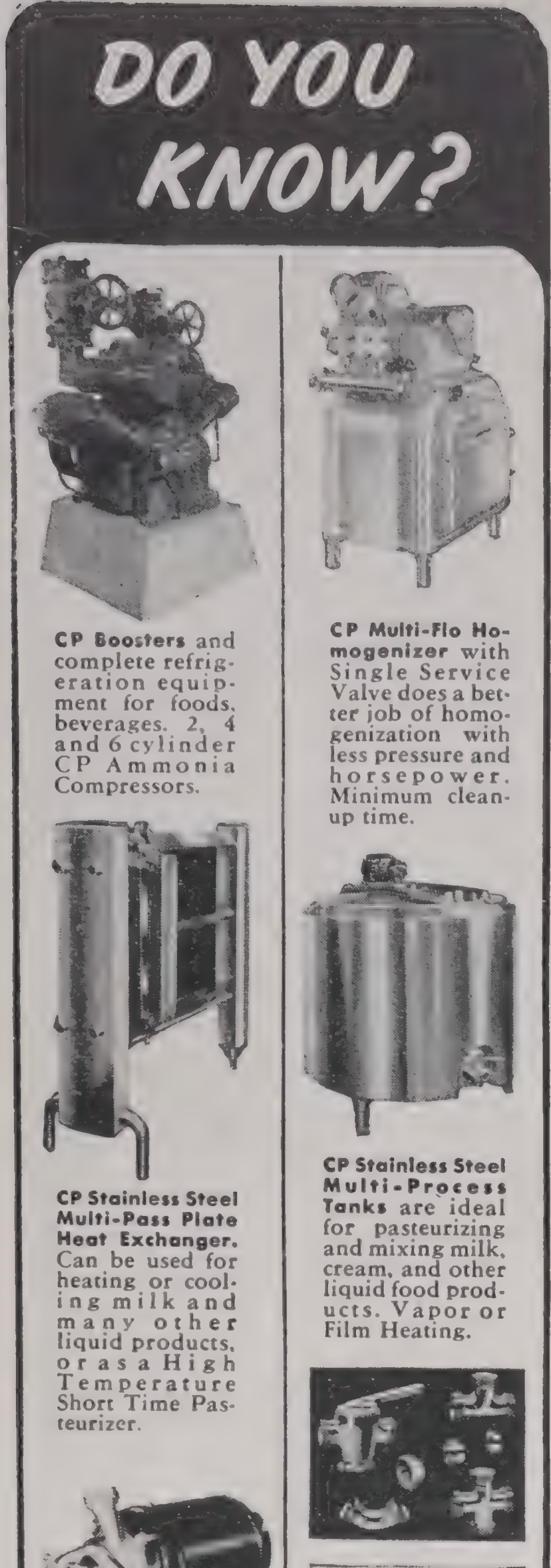

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CP Multi-Flo Homogenizer with Single Service Valve does a better job of homogenization with less pressure and horsepower. Minimum cleanup time.

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What Washington Thinks

By R. S. McBride, Washington, D. C.

BUSINESS INDEX—We all want to have some index of changes in business activity so that our own company planning can, as much as possible, be guided by facts. Washington finds one of the best general commodity indexes to be the record of freight car loadings. These figures represent total goods moving by rail, a very significant gage of the extent to which business is speeding up or slowing down.

It is interesting to note that in the first six months of 1949 there was a drop of almost exactly 10 percent in car loadings, as compared with the year before. The drop between 1947 and 1948, during the same calendar period, was about 5 percent.

Guesses for the third quarter, now ending, made by Shippers Advisory Boards, indicate an expected drop smaller than for the first half of this year. Obviously, food shipments have dropped less than average, since folks like to eat even during a business recession.

NEW "ECONOMIES"—A lot of food manufacturers would like to know how to apply in their business the recent report of economist Robert Nathan made for United Steel Workers of the CIO. He says that wages could be raised substantially (and, of course, he says they should be) with "only a minor dent in the profit structure in the steel industry." Many other folks in Washington feel that this new theory of economics will have large political appeal. Certainly it would be fine if everybody could get more money, including the stockholder in his dividend checks. We doubt Nathan's conclusions.

MEAT PRICES—A careful and critical analysis of the make-up of the retail price of meat made by the U. S. Department of Agriculture shows where most of the market basket spending finally goes. In 1932, the farm producer got 6.8c. out of the 20c. per pound which was the average retail payment of the housewife. This payment jumped to 55.4c. in 1947 and the farm producer of the animal got 35.4c. of this, more than five times as much per pound as 15 years before.

In that interval, cost of marketing the animals, meat packing, wholesaling, and retailing had gone up only from 13.2c. to 20.0c. per pound. If the producers' share had changed only in the same ratio, the meat would have sold at retail for about 31c. instead of 55c. per pound. Needless to say, the politicians with agricultural voters back of them do not chose to spotlight these relationships.

ULTRAVIOLET INEFFECTIVE—Tests in California have been made to see whether ultraviolet radiation of peaches and nectarines would kill the spores of the fungi that cause decay during marketing. Even with exposure four to five times as long as is normally practicable, the agricultural investigators say that spore control is not effective. In fact much of the fruit shriveled during transit, or was otherwise injured by handling, offsetting any gain in fungus control. Uncle Sam wisely says, "let's not do this commercially."

OPPOSING EFFECTS—Refrigeration changes food geography materially in two ways. The home freezers and locker plants permit more local use of foods produced near home, since users can keep short crop-season material for long season usage. The opposite effect is noted from commercial cold storage and refrigerated transport. These permit and encourage use of perishable foods in regions far away from the producing area. Economic analysis of perishable fresh food in competition with processed foods must take account of these two opposing tendencies.

HAWAIIAN TROUBLES—Washington has been awakened to the calamitous situation in Hawaii, where sugar and pineapple industries have been practically wrecked economically by labor and transportation troubles. Everyone interested in either pineapples or sugar will be directly affected. Many other divisions of food industries will feel the impact indirectly. Hawaii as a market for all kinds of food has almost collapsed in the chaotic changes that have occurred. A combination of sugar and pineapple troubles and reduction of military spending has cut the gross income of the total population about in half. That is a big enough change to be felt at remote points in our industries.

INSTEAD OF DDT—Strenuous effort has been made by federal research workers to offer the dairy industry satisfactory fly control material. Their investigations have recently culminated in a series of recommendations regarding the use of lindane, which is the common name for the pure gamma isomer of benzene hexachloride. Being okay for dairy barns, it is also suitable for a large number of food factory applications. Those desiring to use it in this manner will be assisted by instructions from the Bureau of Entomology at Washington.

Lindane is strongly recommended as a residual spray that can be safely used in places where milk is handled. For complete fly control, it must be used together with suitable space sprays of pyrethrum. And, in the case of farms, additional sprays are permissible on the cattle themselves. Since careful applications remain effective for several weeks, the use of this material is a very great advantage in controlling the flies that still get in despite care in screening.

INVENTORY LOW?—It is hard to tell whether food industries have allowed their inventories of plant equipment, parts, and spares to drop below normal. Many have certainly cut back on dollar investment in total inventories, including raw materials. This was a logical change made deliberately when it looked as though prices of everything were going to decline seriously. That decline has not been continuing in certain lines of goods that are of interest to many companies in our business.

Some technical observers in Washington are beginning to wonder whether there may not be difficulty in getting parts and spares and supplies promptly as needed during the late fall season. Serious result seems likely to occur if everybody has to rush into the market between Labor Day and Christmas. A careful look-see by the purchasing agents and the storekeepers seems important.

EGG PRICES—Farmers got over four times as much for eggs in 1948 as in the last five prewar years. But that cash reward is not enough to prevent continuance of price supports by the government.

OUR RESPONSIBILITY—Substantial progress has been made in official planning by Public Health Service for its part in the Federal Water Pollution Control Program that was set up by law last year. Top executives in charge of this activity at PHS are offering cooperative service to industry in the hope that joint effort will most quickly result in a clean-up of the more serious stream contamination problems. But the government does not intend to do all the work. It is officially stated by the chief of the Public Health Service division: "The responsibility for development of treatment methods for industrial wastes rests primarily with industry."

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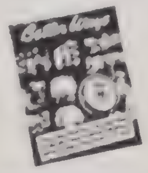
Accurate batching . . . automatically controlled by Toledo Scales . . . helps to maintain unvarying quality in production of Bromo-Seltzer at the Emerson Drug Company, Baltimore, Md.

Shown here is part of the efficient production system of this plant. The dry, granular processed salt is fed to the bins by a belt operating in a stainless steel housing. The material is weighed into the portable hoppers shown on the scale platforms . . . with Toledo automatic controls cutting off the filling operation at precisely the desired weight.

Control your costs and quality with TOLEDO all the way . . . in weighing, counting, force-measuring, batching or testing. Send for new bulletin No. 2020. Toledo Scale Company, Toledo 12, Ohio.



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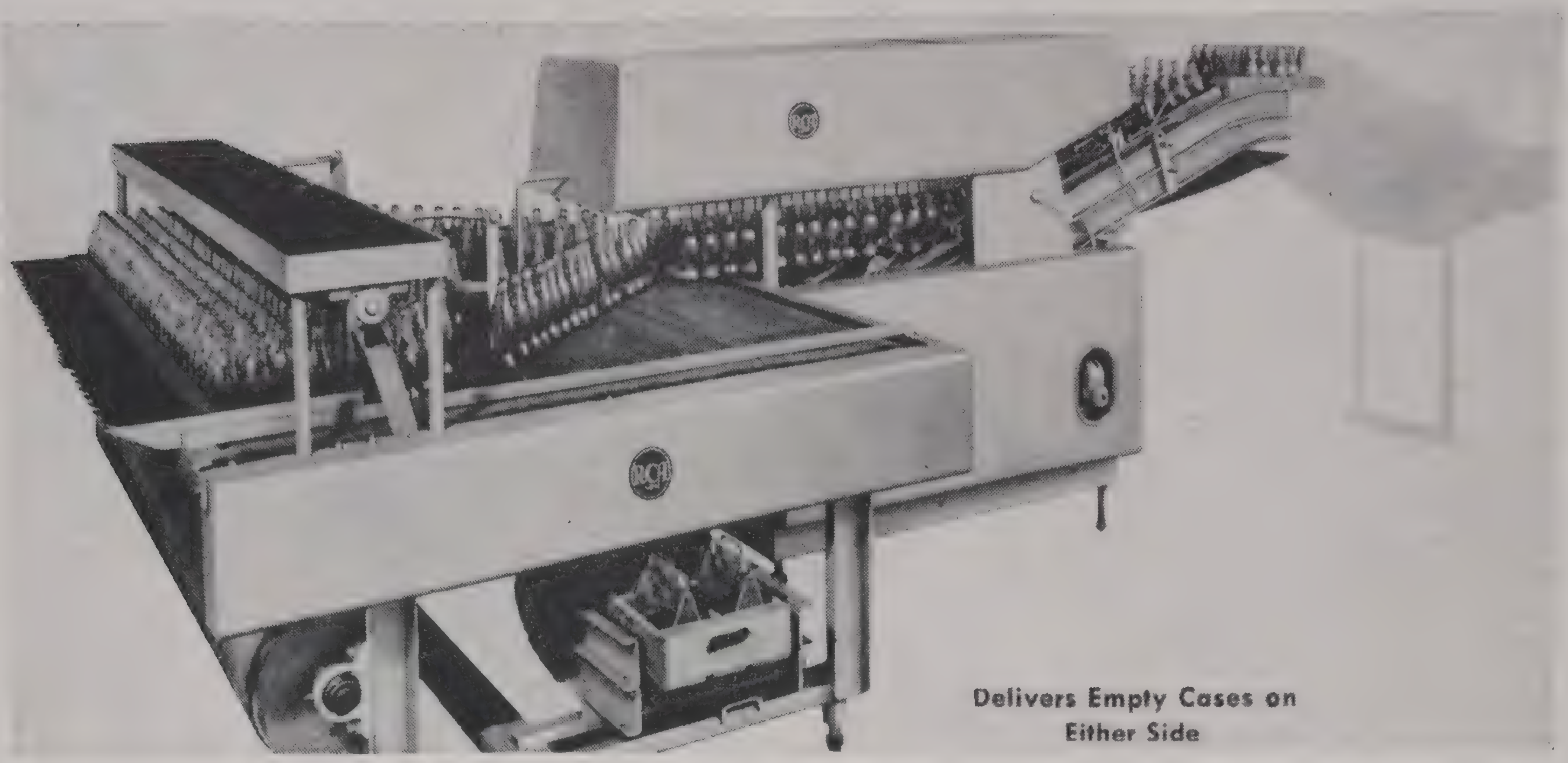


Uncaser and Washer-Loader Has High Capacity

High-speed unloading of beverage bottles from cases, and automatic feeding at uniform rates to the bottle washers, are accomplished by a new bottling plant machine.

RCA uncaser and washer-loader is fully automatic and can feed bottles to the washer at rates up to 500 per min., eliminating one of the last manual steps in the beverage bottling cycle.

Cases containing empty bottles feed from the plant case-conveyor directly into the uncaser. As each case is carried down an incline, continuous rows of fingers gently grip the necks of the bottles and move forward horizontally at the same speed as the case. The widening angle separates the bottles from the case smoothly, easily, and with virtually no knocking together or abrasion. When bottles are in cartons within the cases, special guides hold the cartons in place while the bottles are being removed.

Fingers of the uncaser automatically release the bottles as they come to the proper position on the washer-loader conveyor table. Provision is made to keep the washer-loader adequately supplied with bottles without its becoming overcrowded.

Machine is readily adjusted to any half-depth case, and is available in sizes to accept 6 to 12-oz. bottles. It may be used with most of the leading types of cartons now on the market. Automatic safety switches stop the machine in the event a bottle is inverted or in any other position which would prevent free passage through the infeed gate.

The uncaser and washer-loader parts of the machine are driven by separate motors. Installation of the proper size sprockets enables speed adjustment to conform with that of incoming bottles. Speed of the uncaser is adjusted to washer-loader speed through a Reeves drive and can be continuously varied.—*Radio Corp. of America, RCA Victor Div., Camden, N. J.*

New Filter Masks Are Light, Flexible, Tough

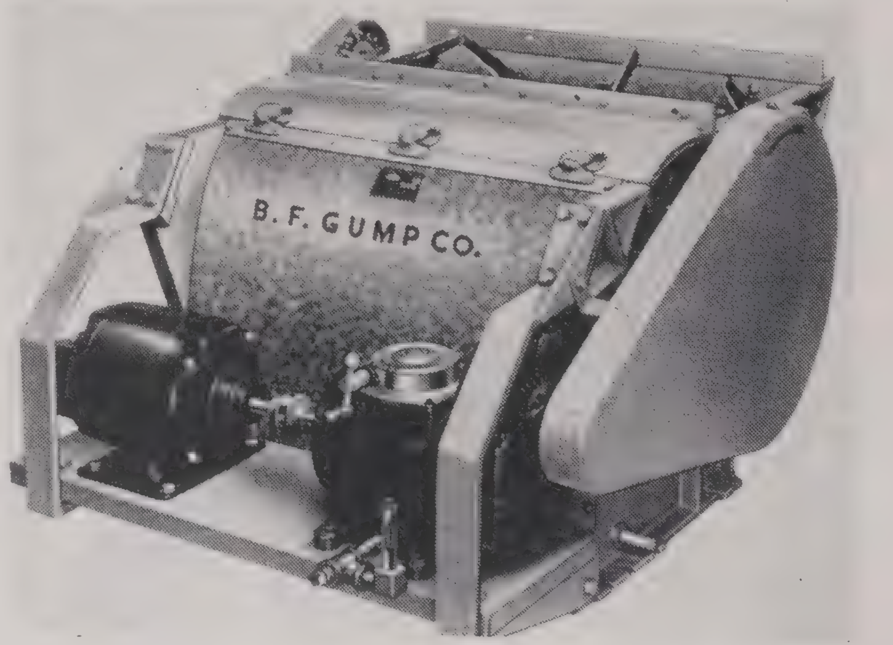
Irritating effects of dusts on workers are stated to be particularly minimized with the use of a new filter mask.

Flex-a-Foam filter mask, made of polythene resin, has three quality features: Light weight, flexibility, and toughness.

Mask frames adjust themselves with comfortable snugness to the face of each wearer, regardless of size or shape. According to the manufacturer, it is impossible to break them in ordinary use.

The filter is a honeycomb of whipped latex ventilated by tiny, interconnecting air cells. This allows the passage of free circulating air, yet keeps out non-toxic, nuisance dusts as small as 1/25,000 in.

Filter can be re-used after washing in warm, soapy water, sterilized in a mild solution of formaldehyde.—*The Goggle Parts Co., Inc., 1468–70 W. 9th. St., Cleveland 13.*



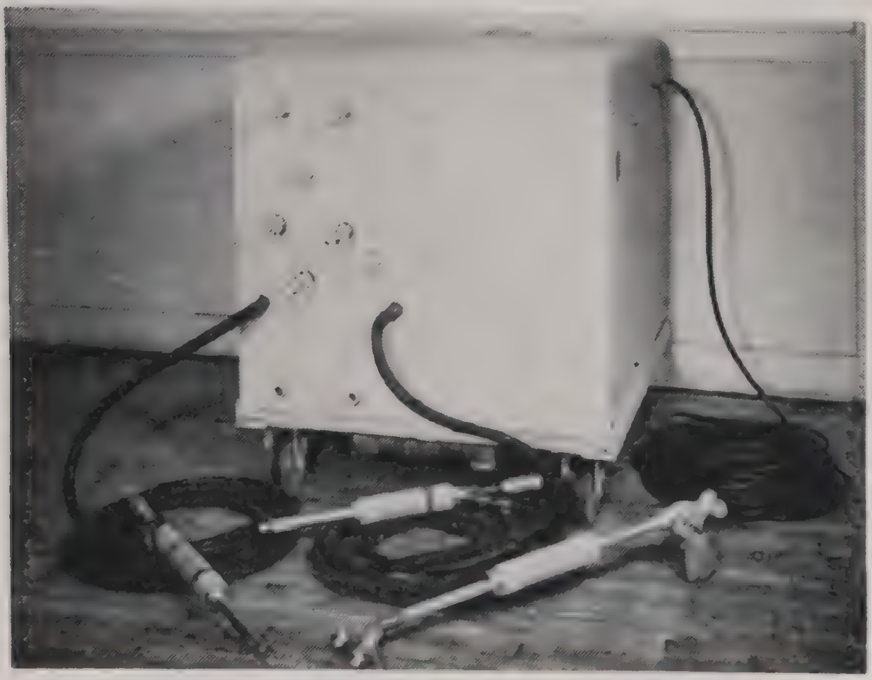
Dry Materials Fed With Improved Accuracy

Dry powdered, pulverized, or granular materials are fed at controlled rates by a new Series 380 "Micro-Master" feeder.

On the new units, the usual double-acting ratchet-drive mechanism has been replaced with a continuous rotary motion, infinitely variable speed drive that has a controlled speed range from zero to maximum rpm. Capacity is easily controlled by simple micrometer-type adjustment, which is complete with dial indicator. Adjustments may be made while unit is in operation.

With this type of continuous rotary drive the feeding cylinder, composed of staggered wing pockets, produces a steady, uninterrupted flow of material from the feeder. Result is improved accuracy in the feeding of ingredients and in making percentage tests.

Feeders may be installed in groups or batteries as percentage feeding units in continuous mixing systems. Centralized control over starting and stopping operations can be engineered.—*The B. F. Gump Co., 431 S. Clinton St., Chicago 7.*



Cleaning Equipment Uses Hi-Pressure Pump

Simplified, rapid cleanup is the purpose of the new Model 2002 "Speed Cleaner." High pressure (up to 400 psi.) loosens accumulated dirt even with cold water.

For grease and stubborn dirt, the operator has hot water (up to 180 deg. F) at the turn of a valve. Then, for the toughest cleaning jobs, hot or cold, dilute or concentrated detergents are on tap for the operator's immediate use.

Heart of unit is a pump built for high pressure performance, with porcelain-lined cylinders to resist corrosion and abrasive action. Trouble-free pump is self-lubricated, with all power-end working parts operating in a constant bath of oil. Rugged eccentric drive with helical gears, sturdy guided plungers, and dependable ball valves are typical engineering features of pump.—*Sprague-Sells Division, Food Machinery and Chemical Corp., Hoopeston, Ill.*

Floor Insulation Made of Glass Fibers

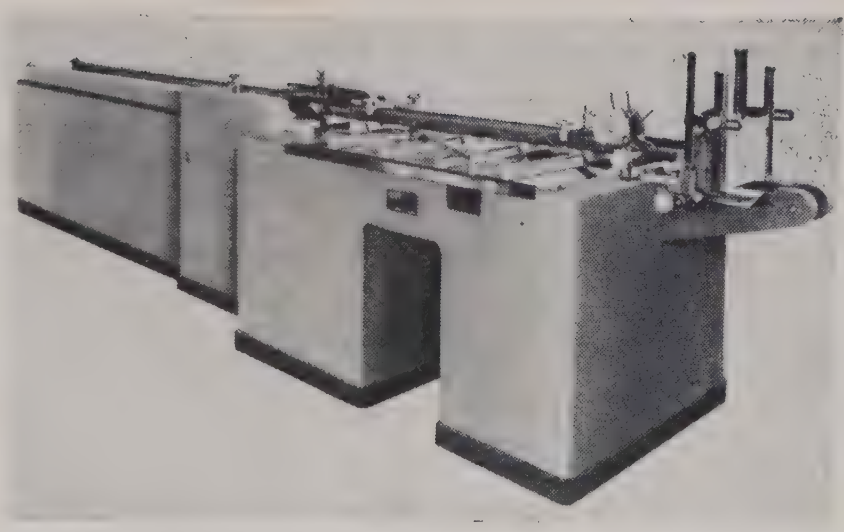
For use under the wearing slabs of cold storage rooms, a new rigid, asphalt-enclosed insulation board, has been designed.

Known as Fiberglas AE-F board, it differs from the company's low-temperature wall and ceiling insulation in that the component glass fibers are arranged parallel to the action of the load, providing increased compression resistance.

Under floor loadings up to 1000 lb. per sq. ft. it will compress less than 1 percent. This compression is not progressive. Density of the board is 6 lb. per cu. ft.

The heavy asphalt coating that completely surrounds the insulating core prevents penetration of the hot asphalt used during installation to form the vapor barrier.

The board is available in 2- and 3-in. thicknesses, 12 in. wide, 36 in. long.—*Owens-Corning Fiberglas Corp., 16 East 56th St., New York City 22.*



Carton Machine Features Ease of Adjustment

Fully automatic cartoning, from product to display packer, has now been realized with the new Model 45 adjustable packaging machine.

The machine performs every operation from start to finish automatically. It feeds and opens cartons, inserts single or multiple products, glue-seals or tucks flaps, and delivers the filled cartons to the packing case.

Ease of adjustment enables economical packaging of short or long runs of widely different size products. The apparatus can carton solid, non-sifting unit items such as bottles, candy bars, and chewing gum.—*Container Equipment Corp., 208 Riverside Ave., Newark 4, N. J.*

Nut Cutter Makes Sharp Granules

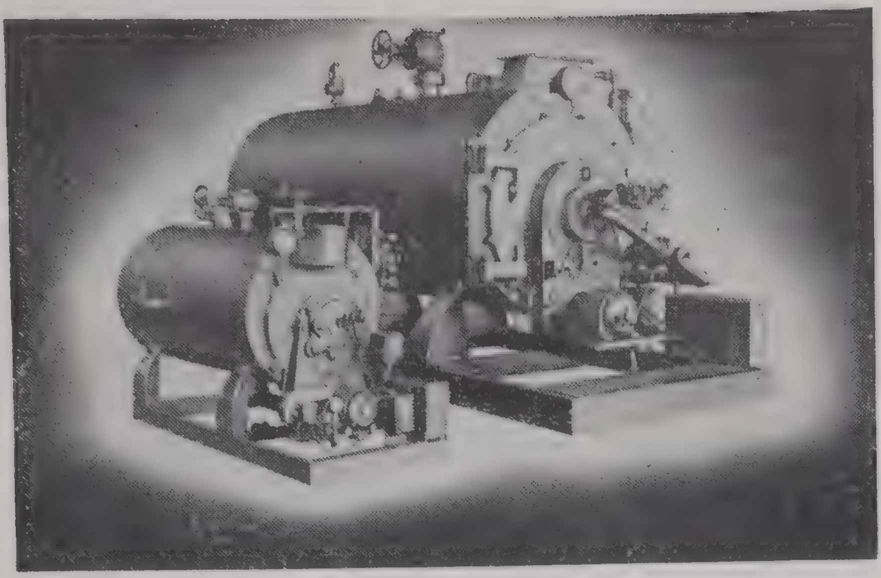
Keen rotary knives of this new granulating machine cut nut kernels into sharp-edged granules for filling or garnishing candies, sundaes, pastries, and the like.

A sorting shaker grades the pieces into sizes to meet the requirements of various end users. Standard No. 365 granulator includes a cutter assembly with $\frac{1}{8}$ in. knife spacing, magnetic separator, motor, starter, and three metal containers. An interchangeable cutter assembly with $\frac{1}{16}$ in. knife spacing may be had at extra cost.

In terms of peanuts, the capacity of the machine is 600 to 800 lb. per hr.

Machine specifications are: Height to feed hopper 40 in., width 23 in., and length 34 in. Motor is $\frac{1}{2}$ hp.—*Bauer Bros. Co., 1740 Sheridan Ave., Springfield, Ohio.*

(Food Equipment Continued)



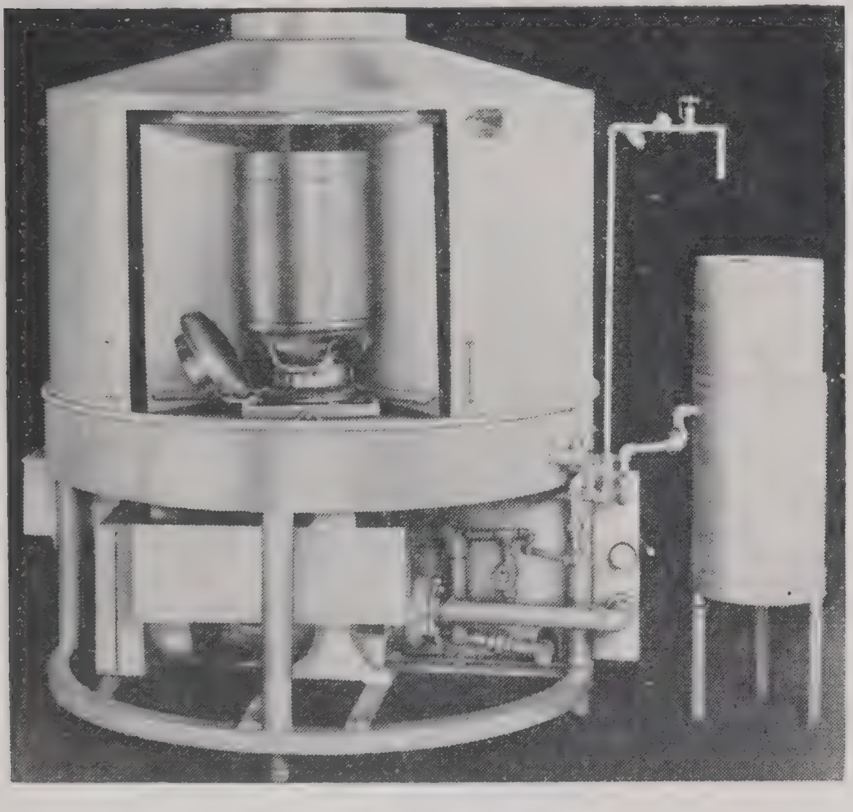
New Boiler Features Precise Fuel Injection

Improvements in basic operating features are emphasized in a new line of steam generators.

A high atomizing burner nozzle incorporating a primary air supply assures precise injection of fuel and air, providing efficient combustion at all firing rates. In addition, the new nozzle design permits interchangeable oil or gas firing without a change of nozzle.

The new nozzle maintains high combustion efficiency with either fuel.

New models also include a simplified air supply system, improved combustion and ignition programming controls, and a blower-air channel design that achieves quiet operation. The new generators are available in sizes ranging from 10 to 300 hp. and in pressures from 15 to 200 lb.—*Cyclotherm Corp., Dept. 15 R, 90 Broad St., New York City 4.*



Can Washer Gives Six Treatments

Considered of particular interest to small and medium-size plants is a new can washer, described by the maker as doing a "most complete" job.

Known as the "Moto-Ro," it has a capacity of 180 cans and covers per hour, and it gives six treatments.

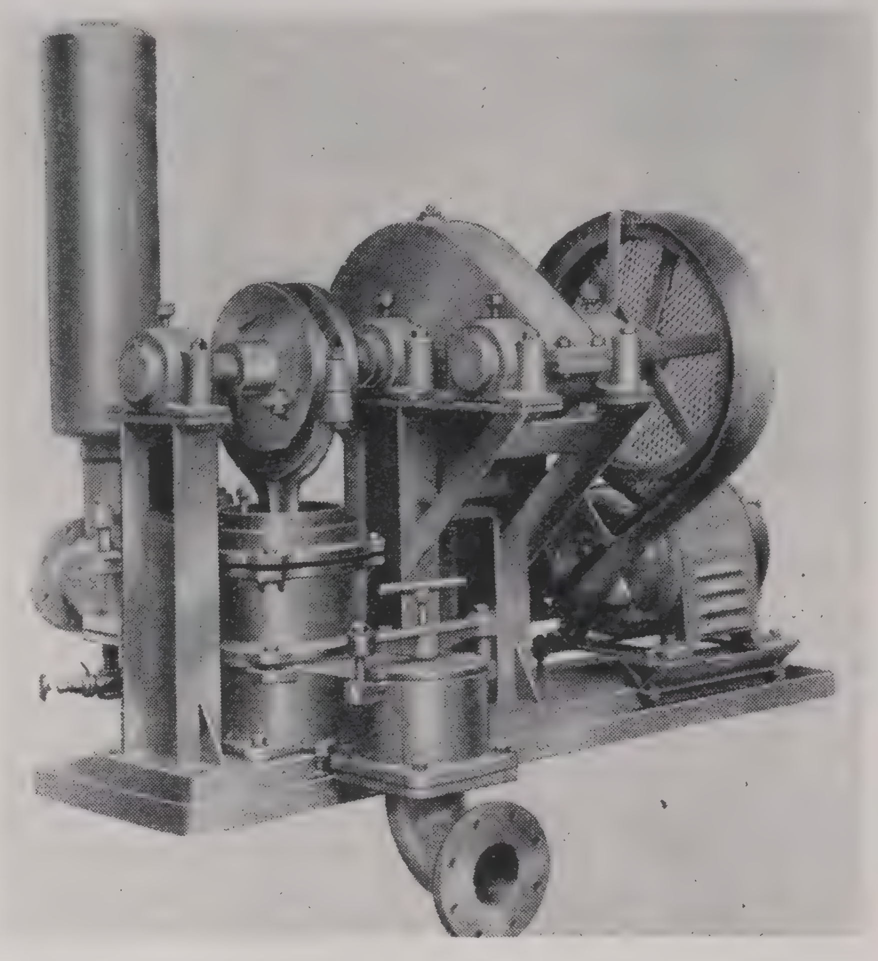
Steam and water are conserved by using "can operated" valves. Movement of the can to the proper position in the cycle automatically starts or stops the treatment being given.

The treatments are (1) Pre-rinse with fresh water, (2) wash treatment with company's "whirling scrubber," (3) hot water rinse to remove wash solution, (4) sterile rinse to sterilize and heat the can, (5) steam sterilization and bottom blow-off, and (6) air drying with filtered, clean forced air.

Operating features include metered water control, no washtank flooding, measured detergent and water supply to the wash tank, thermostatically controlled temperatures, and drip shields to prevent splashing during treatments and dilution of wash solution.

Among the mechanical features are the accessible, adjustable and positive drive; spring-loaded clutch to prevent damage; high-speed large volume, unit-type pump; ball-bearing, splash-proof motor; and removable wash tank.

Complete machine will pass through a door opening 56 in. wide by 70 in. high. Partial dismantling permits the machine to go through an opening 34 in. wide by 50 in. high.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago 6.*



Plunger Pumps Offered In Four Sizes

For moving heavy wastes encountered in many kinds of food processing, a new series of pumps has just been announced.

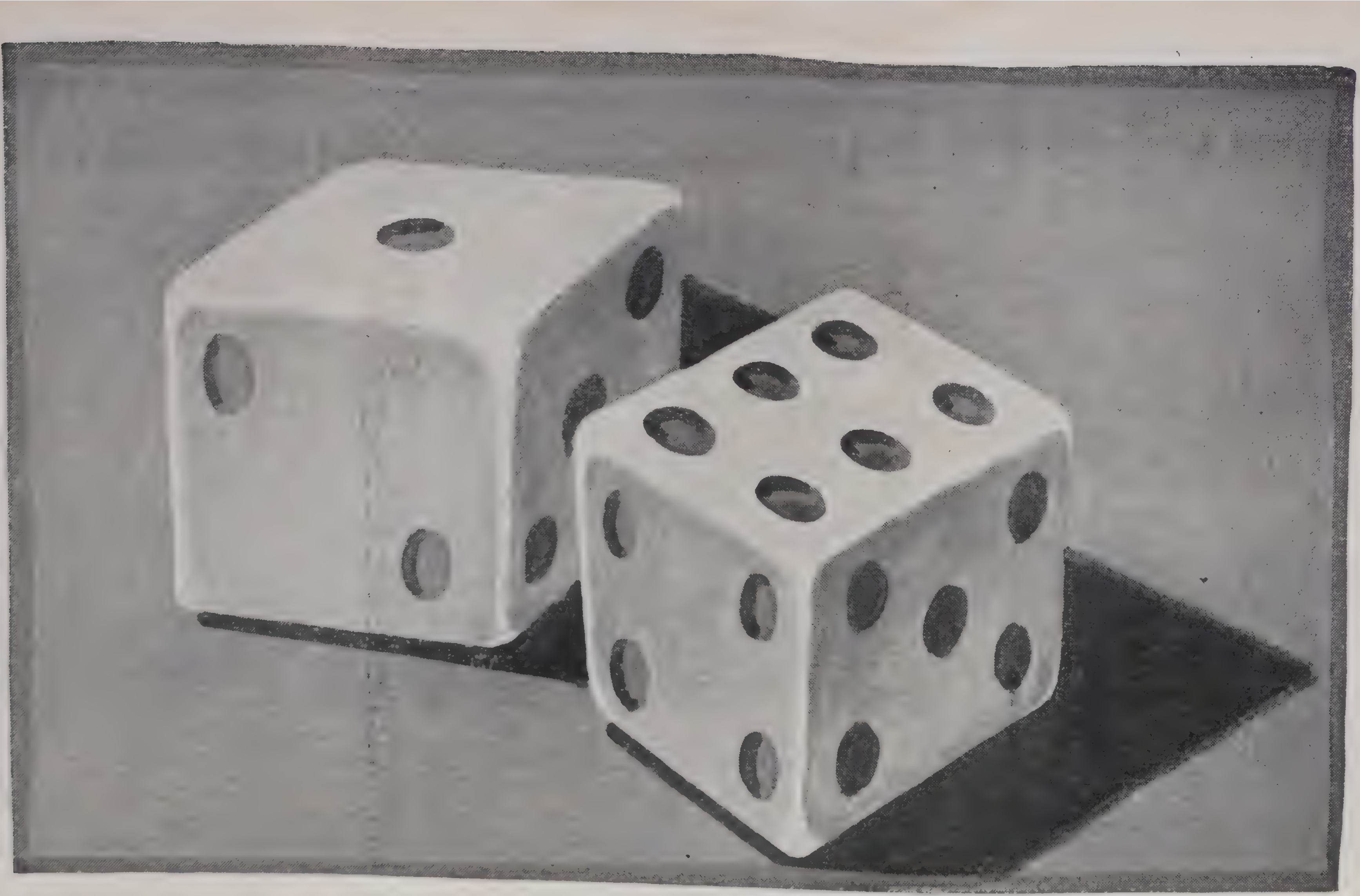
Series consists of four sizes and two types of motor-driven plunger pumps. They will handle the heavy, sluggish refuse of canneries, frozen food preparation plants, and other edible goods processing and packaging industries.

Design and construction of the plunger pump enables it, according to the maker, to move heavy sludges as well as solids in suspension. It will pass large quantities of bulky substances and will run continuously and smoothly even under extremely severe conditions.

Sizes of the plunger pump line are designated as simplex (shown in illustration), duplex, triplex and quadruplex. Standard flanged suction and discharge pipe connections are 4 in. for the simplex and 6 in. for the triplex and quadruplex. Normal duty models (simplex and duplex) range in capacity from 3,150 to 16,800 gph. High pressure models (triplex and quadruplex) have capacities from 218 to 296 gpm. at 100 lb. pressure.

Maximum suction lift for the 4 sizes is 20 ft. and maximum discharge head is 40 ft. for all except the quadruplex which is specially figured depending on installation.—*Marlow Pumps, Ridgewood, N. J.*

(Food Equipment Continued)



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If you have a problem that ordinary papers can't handle there are 179 chances that you will find the answer in Patapar Vegetable Parchment. This unique paper is produced in 179 different types. Each type has special characteristics to fill special needs. For example, suppose your problem calls for a type of Patapar that permits "breathing". We can give it to you. Or we can give you a type that is air tight. Other types of Patapar fill varying requirements of wet-strength, grease-proofness, moisture vapor resistance, thickness, translucency and many other characteristics.

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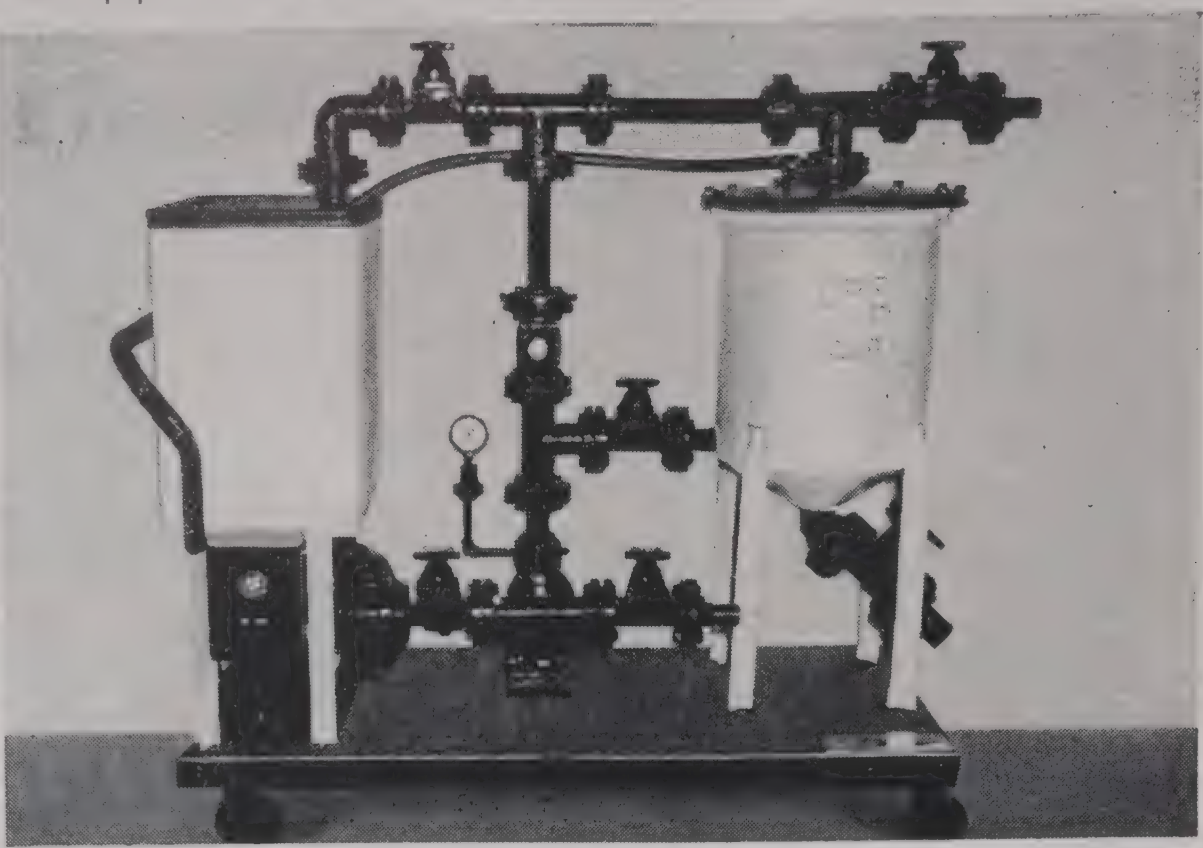


Rubber and Saran Linings Used in New Filters

New filters, Series SLA, constructed of Saran-lined steel pipe and fittings, and rubber-lined filter and precoat tank, have been announced.

Units can be used in filtration of corrosive liquids since both Saran and hard rubber have good resistance to most of the common organic and inorganic chemicals. Filter parts lined with these materials combine a high degree of corrosion resistance with the supporting strength of steel backing.

They can be used at temperatures between 0 deg. F. and 180 deg. F. for general service. Both the Saran and rubber lining have good insulating properties, and help maintain an even temperature in the solutions being filtered. They exhibit resistance to erosion and abrasion.

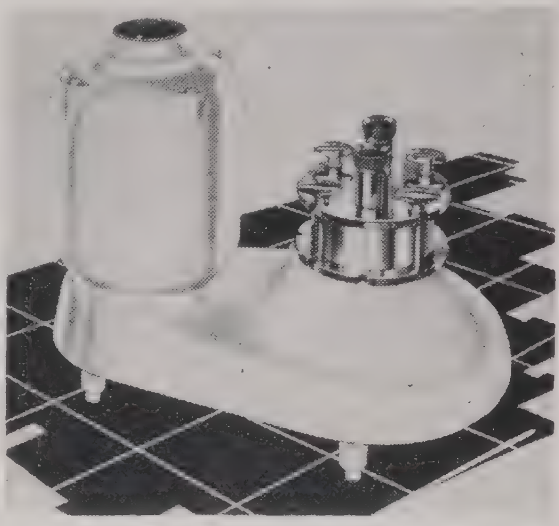
A new method of back-washing cleans the filter in a few minutes. Filters are operated by turning a few valves and are almost completely automatic, removing suspended particles down to 1/10 of a micron.

Unit shown has a capacity of 1,860 gph. open pumping; other sizes are available.—*Titeflex, Inc., Frelinghuysen Ave., Newark 5, N. J.*

Over-Fire Jet System Minimizes Smoke

To prevent smoke formation, a newly developed system known as "Pliojet" has been announced. Secondary air is injected into the fire where it is needed and mixed with the unburned gases for complete combustion. Over-fire jets are arranged in ten standard sets, making it possible to select the arrangement that will provide adequate penetration at maximum firing rate.

Installations of this system are adapted to individual requirements. System consists of turbo blower, conductor pipe, manifold and high-temperature alloy jet nozzles.—*Plibrico Jointless Firebrick Co., 1800 Kingsbury St., Chicago 14.*



Sanitary Rotor Pump Cleaned Quickly

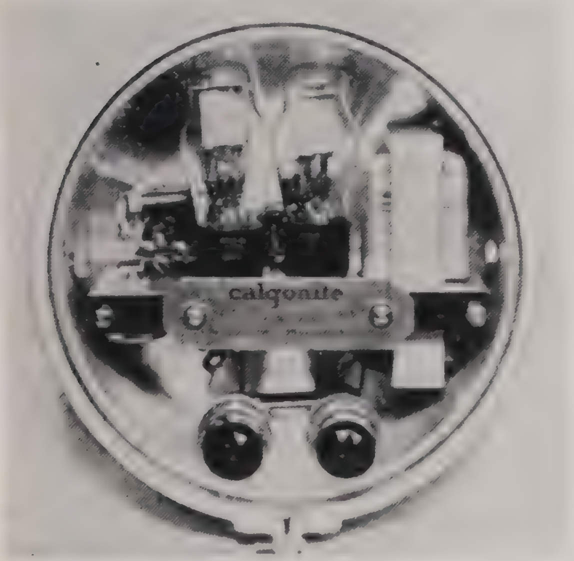
Milk, cream, ice cream mix, and liquid foods are pumped by a newly developed rotor pumping unit.

The unit retains the company's gear-within-a-gear pumping principle, with positive suction and discharge, and no splashing, foaming or pounding. The pump is built of approved solid dairy metal, and it can be turned to any one of four positions, including complete reversal of suction and discharge port locations.

A new, simple, leak-proof C-ring seal is slipped into groove on rotor shaft. Danger of marring and scratching of small, highly polished steel pieces is eliminated.

Drive is from a totally inclosed sanitary approved 1,200-rpm. motor, which mounts directly onto combination base and drive case. V-belt drive is inclosed in white enameled case. Sanitary legs raise unit off floor for quick and handy cleaning. New removable sanitary pull-about casters can be inserted if desired.

Pumps are available in four sizes, 17, 35, 50 and 92 gpm., which operate at 400 rpm. Though the 400-rpm. drive is standard, 300 and 500 rpm. are also available.—*Viking Pump Co., Cedar Falls, Iowa.*



Automatic Unit Controls Washing Concentrate

Automatic maintenance of any required concentration of washing compound is the function of a new control unit.

Major or basic parts of the control are supplied separately so that a "tailor-made" installation can be made on practically any type of commercial mechanical washing machine. These parts are: (1) A control circuit, sealed in a control box with a transparent face, which measures the conductivity of the washing solution and operates a switch that actuates, (2) a solenoid valve, in the cold-water line, (3) a 14-qt. stainless steel mixing tank, equipped with a motor and agitating impeller, (4) a sensitive, durably constructed cell.

The control operates on 110v. 50-60 cycle alternating current. It is wired into the starting switch of the washing machine, or may be operated by a separate switch if preferred. A green light indicates that the control is functioning. The cell, which is permanently located in the wash tank near the bottom of the wall, passes a certain amount of electric current, depending upon the alkalinity of the water in the tank.

Current is measured in the control which causes the solenoid valve, located in the cold-water line, to open. This permits fresh cold water to enter the mixing tank and dilute the concentrated solution there. The resultant mixture overflows into the wash tank

(Food Equipment Continued)

A versatile valve for general service

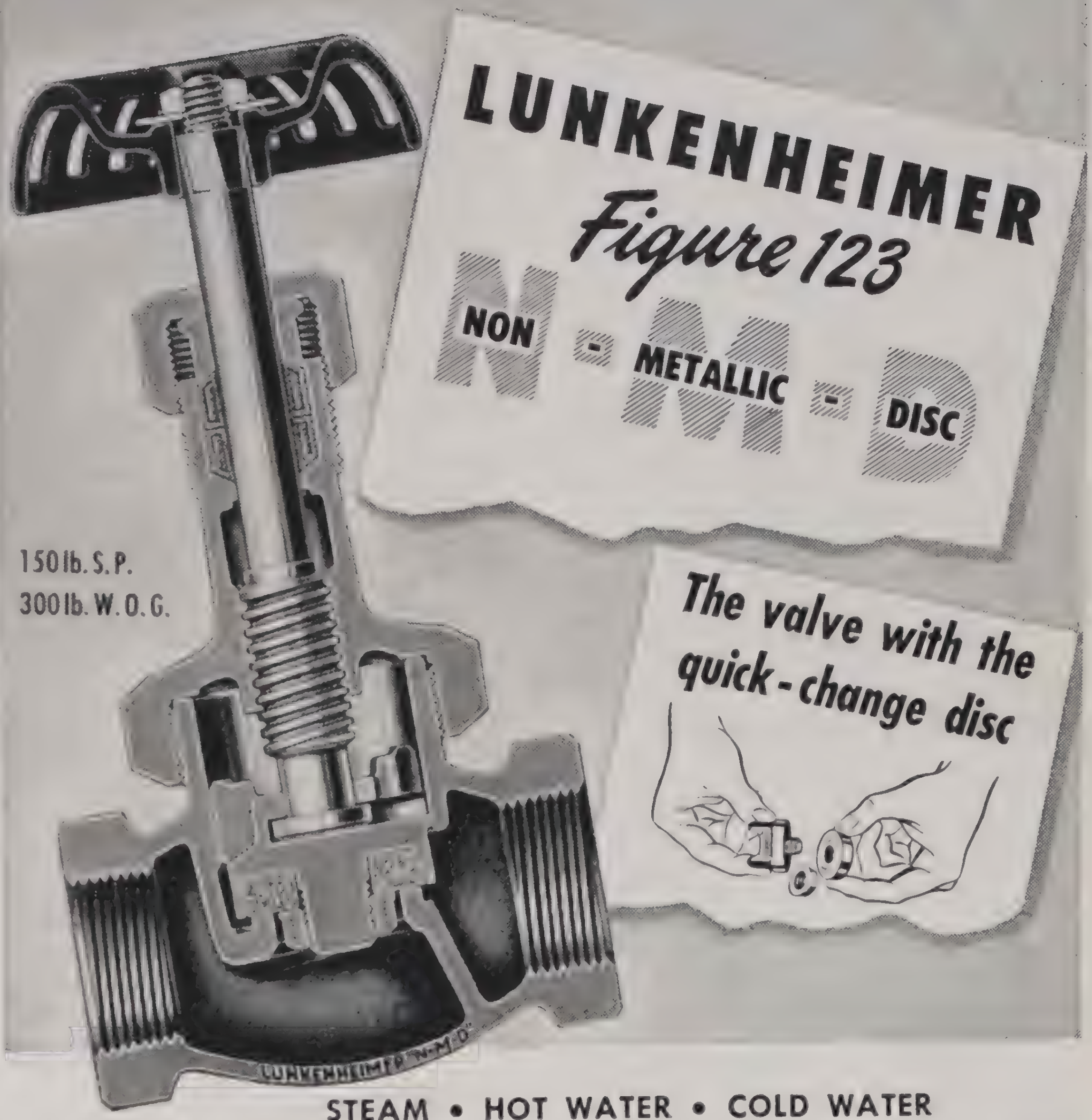


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Fig. 123 is an exceptionally rugged valve . . . available with various types of discs especially compounded to give top results on the services for which they are recommended. Discs can be renewed or interchanged quick as a wink, insuring long-time satisfactory valve service with negligible maintenance expense. Disc holder is slip-on type, perfectly guided. Hexagon head gland is an aid to easy repacking. A further economy feature is the distinctive long-wearing stem material developed by Lunkenheimer, eliminating stem-thread failure due to wear.

The "N-M-D" valve is also regularly available in angle, check and quick operating patterns. Circular No. 558, descriptive of the complete line, is yours for the asking.

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KLEER-MOR
Popular wetting agent detergent for all hand cleaning jobs in the food industries. Rapid detergent and emulsifying action.

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Concentrated powerful liquid-type sodium hypochlorite disinfectant and germicide. Ideal for food plants. Leaves no film.

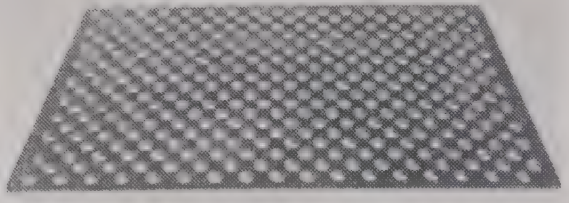
STER-KLEEN
Organic acid detergent compatible with all quaternaries. Removes lime film and alkaline deposits from equipment.

STER-BAC
An outstandingly powerful quaternary for sanitizing food plant equipment and preventing mold growth.

Offices in Principal Cities
A Klenzade field technician will gladly call and help you plan a complete plant and equipment cleaning program.

KLENZADE PRODUCTS, Inc.
BELOIT, WISCONSIN

until the wash water reaches the predetermined strength, then the control circuit closes the solenoid valve—*Calgon, Inc., Hagen Bldg., Pittsburgh 30, Pa.*

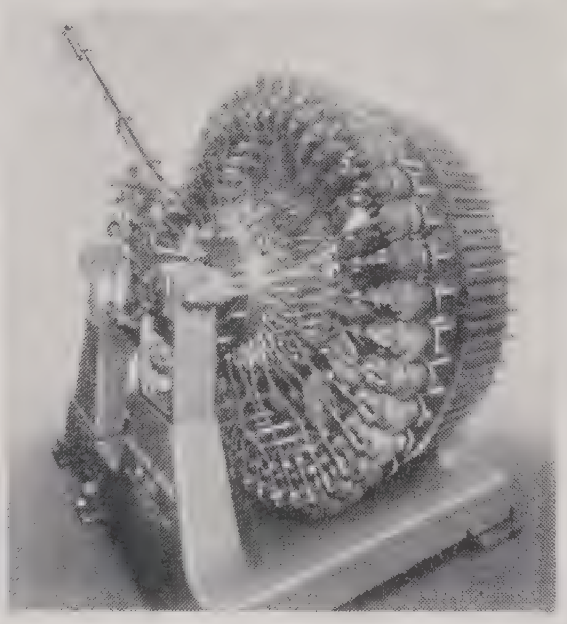


Round-Edged Openings Used In Grading Screens

Clogging of screen holes, interfering with the passage of grains, seeds, and nuts through the perforations, is reported remedied with a new type of grading screen.

Made of perforated metal, its holes are dished to give the openings rounded lips. Viewed from the lower side, the openings are flanged; hence the plates are termed flanged screens.

When the screen is used for cleaning, sticks, stems, and straw glide over the holes without being snagged and upended as they would be if the edges of the openings were sharp. The flanged screens are made in standard and special sizes to meet all requirements. —*The Bauer Bros. Co., 1740 Sheridan Ave., Springfield, Ohio.*



New Unit Tests Cans At High Speeds

High speed performance in testing of round soldered sanitary open-top cans is one advantage of a new air-pressure can tester. In addition, it eliminates the double-sealing hazard and will therefore not pass bad cans as good ones. The unit is also employed for testing soldered end, vent-hole milk cans.

New Pharmaceutical Laboratories Air Conditioned with Frick Refrigeration

Baxter Laboratories, which have the largest production of intravenous solutions and blood transfusion equipment in the world today, use two Frick NEW "ECLIPSE" compressors for cooling the offices, research departments, and many work areas in their recently completed plant at Morton Grove, Ill. This covers 300 by 400 ft. Frick installation made by Midwest Engineering and Equipment Co., Sales Representatives in Chicago.

Office and Plant are Modern Throughout

One of the Air Conditioned Laboratories

Assembling Expendable Transfusion Sets

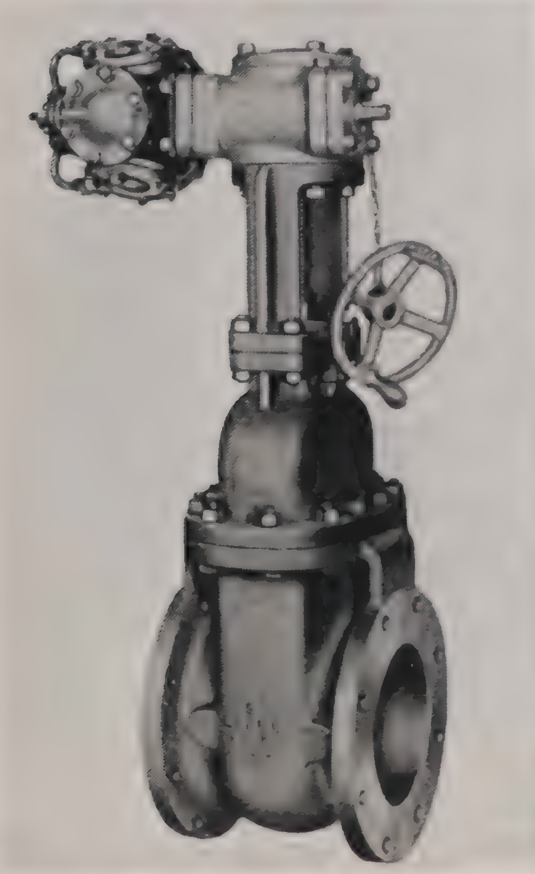
When you want dependable air conditioning, refrigerating or ice-making equipment, engineered to your special needs, look to

DEPENDABLE REFRIGERATION SINCE 1882
FRICK Co.
WAYNESBORO, PENNA. U.S.A.
Also Builders of Power Farming and Sawmill Machinery

Two Frick NEW "ECLIPSE" Compressors

Model 301, with 44 pockets, handles small cans, ranging from 1¾ in. up to 4¼ in. in dia. and from 2 to 7⅜ in. in height. This unit weighs 11,500 lb., occupies floor space 100 by 60 in., and is 81 in. high.

A second unit, Model 302, with 22 pockets, is for testing larger cans. It has speeds up to 200 cans per minute. This model handles cans with diameters ranging from 3½ in. to 7¾ in. and height from 2¾ to 12 in.—*Lima-Hamilton Corp., 60 E. 42nd St., New York City 17.*



Fluid-Motor Valve Operator Has Adaptable Unit

More extensive use of motor operated gate valves is now possible with a simplified fluid-motor operator, since the actuating unit can be easily adapted to standard valves. In the past, motor-operated valves were made to order for each installation.

The device can be operated by water, oil, or compressed air or gases. The motor unit, comprising the motor, gear box and yoke, is bolted to the valve bonnet. The motor operates the valve stem through the gear box, and derives its power from five flexible diaphragms, mounted radially about an eccentric on the drive shaft.

The operating fluid is admitted in rotational sequence to the five diaphragms, which actuate pistons that transmit the thrust to the eccentric through a roller bearing mounting on the shaft. By means of a suitable control, the operating fluid can be admitted through either of two entrance ports, controlling direction of operation of motor for opening and closing valve.

Finer food **FLAVOR** for greater food **SALES**

In ever increasing numbers, modern food manufacturers are coming to realize the value of wheat protein derivatives in improving food flavor. And they realize, too, the importance of the dependably high quality and uniformity of

HURON

MonoSodium Glutamate

and

Hydrolyzed Vegetable Proteins

HURON, the pioneer in the commercial development of MonoSodium Glutamate in this country, has been supplying food manufacturers since 1934. HURON Specialists work with food manufacturers and have a PRACTICAL knowledge, based on years of experience in the application of these products, their properties, and correct usage. This HURON know-how is ALL IMPORTANT to you . . . here is one example of the wide range of information HURON can give you:

No. 1 of a Series

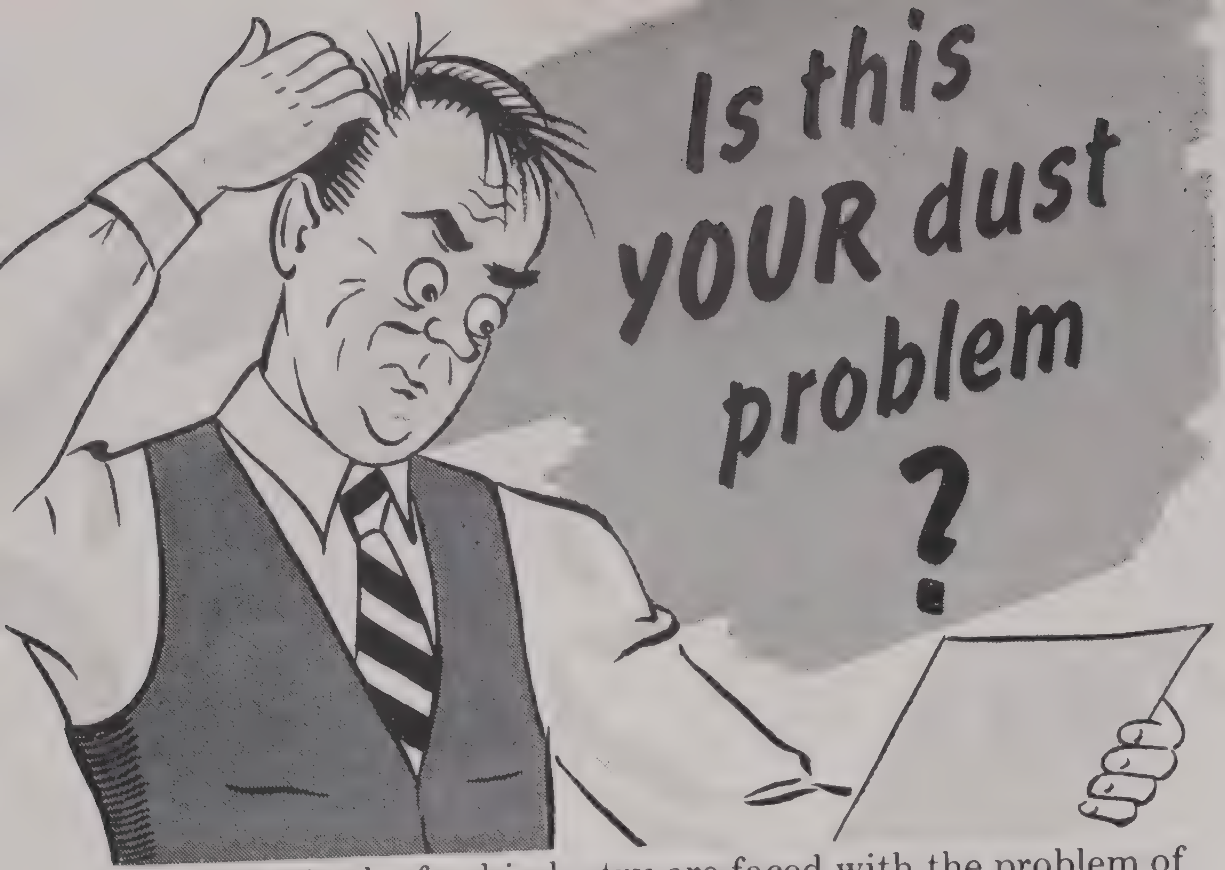
SOUPS (canned and dry)

In soups MSG and HVP have proven to be indispensable ingredients. Their use, singly or in combination, produces the exact flavor characteristic desired. On a ready to serve basis Glutamate is used in chicken soups at levels of 0.2% to 0.4%. Mushroom soups, creamed vegetable soups normally require from 0.15% to 0.25%. Vegetable soups employ 0.1% to 0.2%. Although all of the Hydrolyzed Vegetable Protein preparations are suitable in soups, the liquids are most convenient for use in canned soups at the following levels: In chicken soup at 0.2%; in mushroom soup and creamed vegetable soups at 0.5%; in vegetable soups at 0.5% to 1.0%; and up to 2% in strong beef stock soups. For dry soup bases, HURON HVP in dry form is recommended.

FOR OVER 50 YEARS

HURON has been a maker of Wheat Specialties for Industry. In this important development in the food flavor field, it is vital to get the best INFORMATION available—to be sure of the best QUALITY. Your inquiry to HURON creates no obligation. Tell us your product . . . your problems . . . let HURON help you. Write for samples, and our Technical Brochure.

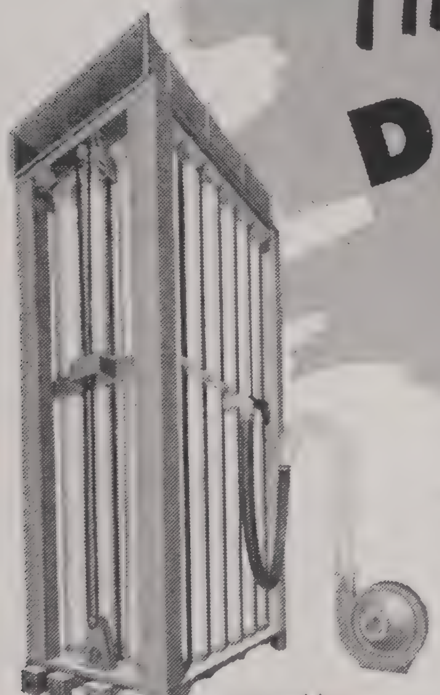
THE HURON MILLING COMPANY
9 Park Place, New York 7, N.Y.


Is this YOUR dust problem ?

Many plants in the food industry are faced with the problem of securing continuous dust recovery with constant air volumes. This cannot be achieved when dust filter sections must be shut down for cleaning or rapping. Shutting down sections overloads the balance of the equipment, builds up high back pressures and reduces air volumes.

If your plant has this problem, The **DAY** Company can help you solve it!

The new DAY "Autoclean" Dust Filter is the Answer



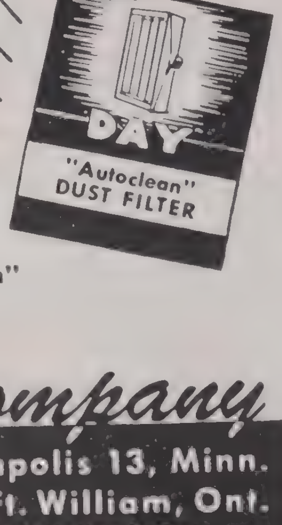
Licensed by
H. J. Hersey, Jr.

The **DAY** "Autoclean" Dust Filter was designed for industries requiring continuous-automatic filtering with constant air volumes and provides:

1. Continuous-automatic operation with a minimum of excess cloth area.
2. Constant air volumes.
3. Parallel air flow.
4. Higher cleaning efficiency.
5. No flat surfaces or ledges within filter to accumulate dust.
6. Economical first cost, operation and maintenance.

Actual installations are operating successfully with air to cloth ratios of 15 or 20 to 1, and with back pressures of only 1 to 2 inches water gauge. Such performance is made possible by the type of filtering felt used and the gentle, yet effective action of the continuous reverse jet cleaning mechanism.

Write-to-DAY for New "Autoclean" Dust Filter Bulletin No. 491.

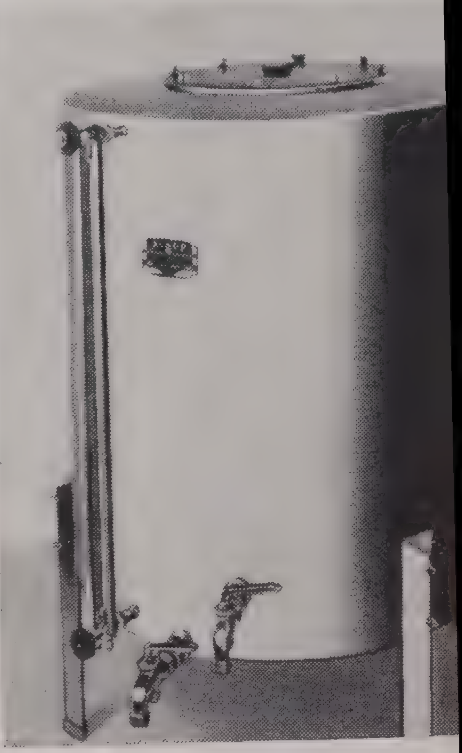


DAY
SINCE 1881
The DAY Company
817 3rd Avenue N. E., Minneapolis 13, Minn.
IN CANADA: P. O. Box 70D, Ft. William, Ont.
Branch Plants in Ft. Worth, Buffalo and Welland, Ont.

When valve gate reaches en travel in either direction, moto stalls, still under pressure. T be no leakage, and shut-off de unnecessary.

Valves can be operated by range of liquids or gases at p from 40 to 300 psi. A hand furnished for manual operatio event of pressure failure.

Valves equipped with the ne motor operator are available types of company iron-body gat in 4 in. through 30 in. sizes. *Co., 836 S. Michigan Ave., Ch*



Sanitation Stressed In Storage Tanks

Air-tight storage and settlin (non-pressure) have been add standard line of stainless steel tanks.

These all-welded tanks are constructed of 16-gage stainle All rounded corners, highly crevice-free surfaces, and f draining bottoms make them s clean and keep sanitary.

Stainless cover with heavy gasket for positive, air-tight tion features a 2 in. center with rubber cork for easy fil may also be had with standar or sanitary fittings. One o faucets can be supplied when positioned to the customer's ments. These are for settli usage, so that clear liquid can b off from the upper faucet f filtration, filling bottles, or processing. The lower faucet used to drain remaining sedi

A complete range of sizes f 250 gal. capacity is carried. faucets, and liquid level gage sembles are available with the tanks.—*Alsop Engineering Co dale, Conn.*

VARIABLE SPEED FOR POWER MODERNIZATION

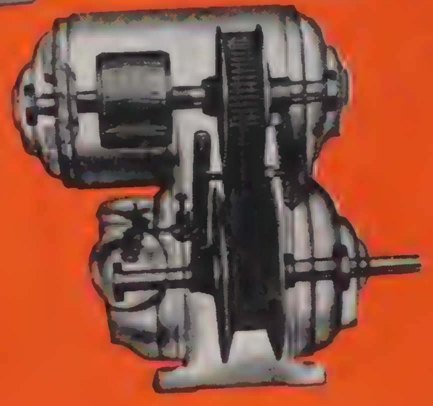
CAUTION
4
3
2
1

IMPROVED STERLING SPEED-TROL

...PERFECT "SPEED CONTROL" IN ONE COMPACT POWER UNIT

Fingertip speed control provides flexible, positive power at the correct speed — faster or slower. Thousands of satisfied users are getting maximum production efficiency under variable conditions with Sterling Speed-Trols.

Improved Sterling Speed-Trol occupies one-half the space formerly required.



Improved Sterling Speed-Trol is the simplest speed control power unit you can buy — accepted V-Belt principle.

Improved Sterling Speed-Trol fits standardized motor mountings.

★

The improved Sterling Speed-Trol is rugged, sturdy, and of balanced design for every horsepower rating. Motor and speed control in one compact, integral unit. Generous capacity — liberal ball bearings — experienced engineering insure long, dependable service. Available in a wide range of speed combinations.

★

Use the improved Sterling Slo-Speed geared motor — where one best constant slow speed is required.

Use the improved Sterling Klosd general-purpose motor — where one best constant normal speed is required.

STERLING ELECTRIC MOTORS

GENERAL OFFICES: LOS ANGELES 22, CALIFORNIA

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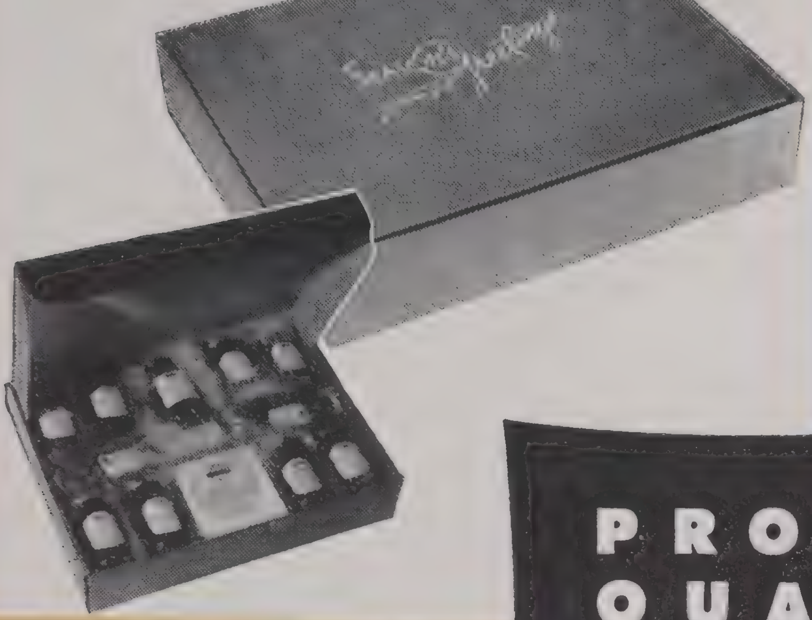
Milwaukee 2 • Memphis • Kansas City 2 • Minneapolis 15
Canadian Sterling Electric, Ltd., Hamilton, Ontario, Canada
Representatives in Principal Cities and Foreign Countries

SUCCESSFUL GIFT PACKAGE
— IN CORRUGATED

At the H & D Package Laboratory, leather and wood and linen patterns are often simulated in corrugated board. Distributors of specialty items, are capitalizing on H & D ingenuity and craftsmanship to sell merchandise. Relatively inexpensive, distinctive in appearance, rugged in construction, these H & D corrugated boxes are a complement to the highest quality products.



FLUORESCENT LIGHTS
Shipped Safely in CORRUGATED BOXES

A complicated problem of packaging fluorescent fixtures—odd-shaped, bulky, fragile—has been solved with an H & D engineered box which has reduced the entire packing operation to a mere 70 seconds! An ingenious arrangement of six interior pieces of corrugated board provides more than ample protection. The packed product can be stacked and loaded and shipped as safely as any other type of merchandise—thanks to H & D package engineering.

Over-ALL Lighting

PRODUCT QUALITY
is reflected by
The Package

Eversal
WATER PUMP
Eversal
Eversal
WATER PUMP
Eversal
WATER PUMP

FAMILY NAME FEATURED
in "Look-Alike" Packages

Quick, easy identification and selection are important where the same product is made in several sizes and several models. Automotive parts, for example, win greater dealer acceptance when the packaging plan includes simplicity, legibility and convenience. The H & D boxes shown here effectively display the manufacturer's name, conserve shelf space, give necessary product information, simplify inventory-taking, require no repacking, provide ample product protection.

REG. U. S. PAT. OFF.

H&D
BOXES

FOR MORE INFORMATION WRITE

HINDE & DAUCH

Authority on Packaging

Executive Offices: 4903 Decatur St., Sandusky, Ohio

FACTORIES IN:

Baltimore 13, Md. • Buffalo 6, N. Y. • Chatham, Ontario
Chicago 32, Illinois • Cleveland 2, Ohio • Detroit 27, Mich. • Gloucester, N. J. • Hoboken, N. J. • Kansas City 19, Kansas • Lenoir, N. C. • Montreal, Quebec
Richmond 12, Va. • St. Louis 15, Mo. • Sandusky, Ohio
Toronto, Ontario • Watertown, Mass.

Catalogs, Bulletins

Food Plant Equipment

Turbine Pumps

Water- and oil-lubricated turbine pumps with closed or semi-open impellers and other interchangeable component parts are graphically illustrated and described in Bulletins 1013 and 1014.—*Johnston Pump Co., 2324 E. 49 St., Los Angeles 11.*

Drip-Proof Motors

Long life and low operating cost of drip-proof and splash-proof motors are attributed in 8-page Bulletin 51B6210B to design which includes heavy cast iron frame completely surrounding all working parts, double insulated stator, die-cast rotor, efficient ventilation, and pre-lubricated bearings. Dimensions and specifications are given, and a variety of controls is illustrated.—*Allis-Chalmers Mfg. Co., 1113 S. 70 St., Milwaukee.*

Piping

Advantages and economies of factory unit-fabrication of welded piping headers, assemblies and valve groupings into one-piece components are discussed and pictured in 4-page folder. Sample unit-fabrications are analyzed.—*Crane Co., 836 S. Michigan Ave., Chicago.*

Sausage Machinery

Grinders, cutters, mixers and stuffers for manufacture of sausages are covered in 38-page Catalog 627. Other equipment such as pans, smokehouse doors, cooking boxes, ham cookers, baking ovens, tools and brushes is also illustrated with specifications.—*The Cincinnati Butchers' Supply Co., Helen & Blade Sts., Cincinnati 16.*

Vacuum and Atmospheric Dryers

Freeze-dryers, shelf-dryers, extraction and solvent recovery apparatus, fumigators and sterilizers, stills, pans, condensers and pumps, all using high vacuum, and atmospheric drum dryers and flakers and tablet machines are pictured and described in 20-page Catalog 49-C.—*F. J. Stokes Machine Co., 5920 Tabor Rd., Philadelphia 20.*

Liquid Agitator

Stuffing box of new side-entering mixer can be repacked without emptying the tank, thus lending it to continuous processing, reports 4-page Bulletin 1492-3. Unit is designed to supply complete agitation to large quantities of liquids.—*Eastern Industries, Inc., 296 Elm St., New Haven 6, Conn.*

Machinery Facilities

Invention, design, and building facilities for milling, food processing and packaging operations are illustrated and listed in brochure offering these special services.—*General Mills, Inc., Mechanical Div., 1620 Central Ave., Minneapolis 13.*

Beverage Mixer

Soft drinks are reported uniformly carbonated and thoroughly mixed by simple, low-cost beverage mixer detailed on information sheet. Mixer handles bottles from 12 oz. down.—*Potter and Rayfield, Inc., P. O. Box 1042, Atlanta.*

AC-DC Switches

For oil burners, small air compressors and lighting circuits, a complete line of front-operated switches is announced in Brochure TEC-1. Units are reported to have ample wiring room, removable interiors, and underwriters' approval.—*Trumbull Electric Mfg. Co., Plainville, Conn.*

Aluminum Pipe Fittings

Installation time is said to be cut as much as 80 percent by use of three basic aluminum pipe fittings from which 14 arrangements can be made, as described in new 4-page folder. Both pipe threading and welding are reported eliminated.—*Reynolds Metals Co., 2500 S. 3rd St., Louisville.*

Air Compressor

Complete standardization and interchangeability of parts are advantages of line of compressor pumps, says 30-page Catalog 10. A total of 108 different models are built from 24 principal parts.—*Air-Flo Compressor Co., Akron 7.*

Large Induction Motors

Basic theory, operation, characteristics, applications and control of large induction motors are presented in 32-page Brochure 200-Syn-28. Squirrel-cage and wound rotor motors are treated with photos, cut-away views and graphs. —*Electric Machinery Mfg. Co., Minneapolis 13.*

Metal Detectors and Separators

Permanent non-electric magnetic separators and electronic metal detectors are featured in 12-page Catalog 14, which includes information on chute and spout magnets as well as magnetic pulleys, drums, pneumatic line assemblies, pipeline traps and floor sweepers.—*Eriez Mfg. Co., 903 E. 12 St., Erie, Pa.*

Dial Scales

Weighing, recording, controlling, classifying, balancing, counting, testing, batching, and force-measuring functions are performed by standard and custom-built dial scales detailed in Form 2020-C.—*Toledo Scale Co., Toledo.*

Cooling Tunnel

Straight-through cooling tunnel for iced and coated goods, featuring a steel rather than canvas belt, increases production 26 percent, reports new information sheet illustrating the apparatus.—*J. W. Greer Co., 134 Windsor St., Cambridge 39, Mass.*

Filters

Laboratory and commercial size filters which utilize porous stone synthetic membranes to support films of filter aid are described and illustrated in 4-page folder. All-metal flexible tubing for gases and liquids is also covered.—*Titeflex, Inc., 574 Frelinghuysen Ave., Newark 5, N. J.*

Vacuum Filling

Fine powders are filled under vacuum into metal, glass or paper containers by machine detailed in 4-page Carter-Vac bulletin and insert. Bulletin includes lengthy discussion of theory and principle of apparatus.—*Mechanical Div., General Mills, Inc., 1620 Central Ave., Minneapolis 13.*

Materials Handling

Portable Power Belt Conveyor

Horizontal and inclined applications of a portable power belt conveyor which may be used for loading and unloading trucks and boxcars, moving materials into balcony bins, stacking, or for boosting in a gravity conveyor line, are shown in 4-page Form SJA-149. Conveyor may be used for cartons, cans, bags, rolls, and the like.—*The Rapids-Standard Co., Inc., Dept. SF-123, 342 Rapistan Bldg., Grand Rapids 2, Mich.*

Electric Industrial Trucks

A questionnaire for determining the correct type and model of truck to use under various operating conditions is included in 4-page bulletin. Illustrated are 20 different models of electric trucks and tractors.—*C. D. Eiler, Crescent Trucks Co., P. O. Box 538, Lebanon, Pa.*

Water Conveyor

Cannery products are conveyed straight up and also around corners by motor-driven Hydro-Conveyor, illustrated with photos of installations in 4-page bulletin. Capacity of 10-12 tons per hour with automatic operation is reported.—*Sinclair-Scott, 1800 Blk. Patapsco St., Baltimore 30, Md.*

Portable Belt Conveyor

Reversible, adjustable, endless belt conveyor that moves goods with gravity conveyor system is featured in Bulletin SL-1-49. Improvements reported include combination roller and slider bed, sturdier construction, and location of motor at low end.—*Speedways Conveyors, 1261 Niagara St., Buffalo 13, N. Y.*

Expendable Shipping Pallets

Low-cost shipping pallets that may be discarded after initial use, yet are strong enough to be reused, are detailed in 4-page folder for shipping economy. Included is questionnaire as aid to proper selection.—*Acme Pallet Co., Inc., 15 Park Row, New York City.*

Elevators and Portable Cranes

Comprehensive line of elevators and portable cranes is presented in 36-page Bulletin 10482, with illustrations, descriptive text, and specification tables.—*Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9.*

Sprockets and Chains

Enlarged line of various types of stock sprockets and single- and multiple-strand roller chains is presented in 40-page Catalog 709, with data for selection, illustrations, dimensions, and prices.—*Diamond Chain Co., Indianapolis 7.*

Sectional Conveyors

Portable and stationary sectional conveyors for use with either flat or trough belts, elevating or horizontal, are covered in Bulletin H-487.—*George Haiss Mfg. Co., Inc., Div. of Pettibone Mulliken Corp., 141 St. and Park Ave., New York City 51.*

Control Equipment

pH Control

"Sta-Green" process for retaining natural green color of canned peas with pH control is detailed in Data Sheet 3.2-8. Electronic potentiometer for recording and controlling pH is described—*Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne & Roberts Aves., Philadelphia 44.*

Regulating Valves

Single-seat, balanced, regulating valves for steam, air, gas, water, oil and chemicals are described, and cross-sectional drawings, photos, tables of dimensions and prices are included, in 24-page Bulletin 47.1.—*Minneapolis-Honey-*

(Catalogs, Bulletins Continued)

PACKAGING SUGAR PRODUCTS
demands
the proper adhesives

"Sweeten it with Domino"
5 lbs.
NET WEIGHT
Domino
Cane Sugar
Granulated
American Sugar
Refining Company

The fact that Arabol has supplied the American Sugar Refinery Company — for more than twenty years — with bag-sealing, carton-sealing and labeling adhesives, is a matter of great pride. It is our aim to provide the one specific adhesive best suited to each need of each user. On this basis, we now serve the leaders in a hundred industries — for more than 1,000 end uses. See the Arabol Representative when he calls . . . he knows Adhesives.

THE ARABOL MANUFACTURING CO.
Executive Offices: 110 East 42nd St., New York 17, N. Y.
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Adhesives ?... ARABOL!

well Regulator Co., Belfield Valve Div., Phi delphia 44.

AC and DC Instruments

Indicating, recording, limiting or signalli controls operating on a.c. and d.c. power c cuits are detailed, with specifications, in Bu letin AC-1. Price lists are included.—*Wheel Instruments Co., 847 W. Harrison St., Ch cago 7.*

Indicating Gages and Testers

Corrosion-resistant bronze indicating gage of several types and ranges are described wit construction details in 4-page brochure. Ac companying booklet covers gage tester.—*Sta Brass Mfg. Co. Div., Williams & Husse Machine Co., Inc., Wilton, Mass.*

Plant Supplies

Wood Preservative

Berry box treatment experiments with non-staining, decay and mildew-proofing preservative for wood are described and illustrated in series of bulletins. Specifications for compound, Nuodex 136, and toxicity data are included.—*Nuodex Products Co., Inc., Elizabeth, F, N. J.*

Engineered Painting

"The Right Paint in the Right Place at the Least Cost" is slogan on cover of 26-page book which describes paint-job planning for production benefits, safety, and economy. Tables and illustrations are given.—*U. S. Gutta Percha Paint Co., Dudley St., Providence, R. I.*

Prepackaging in Corrugated Boxes

Problems of factory packaging in selling units for extra eye appeal, reduction of losses in handling and shipping, and simplified sales, are treated in revised Publication 9 of Little Packaging Library. Descriptions and illustrations of methods now in use, also costs, are detailed.—*Hinde and Dauch Paper Co., Sandusky, Ohio.*

Waterproof Adhesive

Excellent machine characteristics for high speed operation and low price are advantages of WPL 25 waterproof adhesive reported in pocket-size folder.—*Stein, Hall & Co., 285 Madison Ave., New York City 17.*

Vibration Control

Transmission of vibrations and noise is reported, in Bulletin ER-701, to be effectively controlled by laminated cork and rubber mounting. Three types of damper are also described.—*Korfund Co., Inc., 48-26-A Thirty-Second Pl., Long Island City, N. Y.*

Fire Extinguishers

New tinning process prevents internal corrosion in fire extinguishers, thus doubles their life expectancy, reports illustrated information sheet.—*American-La France-Foamite Corp., Elmira, N. Y.*

Soap and Soap Equipment

Industrial liquid soaps, soap dispensers and tanks and fittings, and paper towels and dispensers are covered in illustrated 12-page booklet.—*West Disinfecting Co., 42-16 West St., Long Island City, N. Y.*

Aluminum Roofing

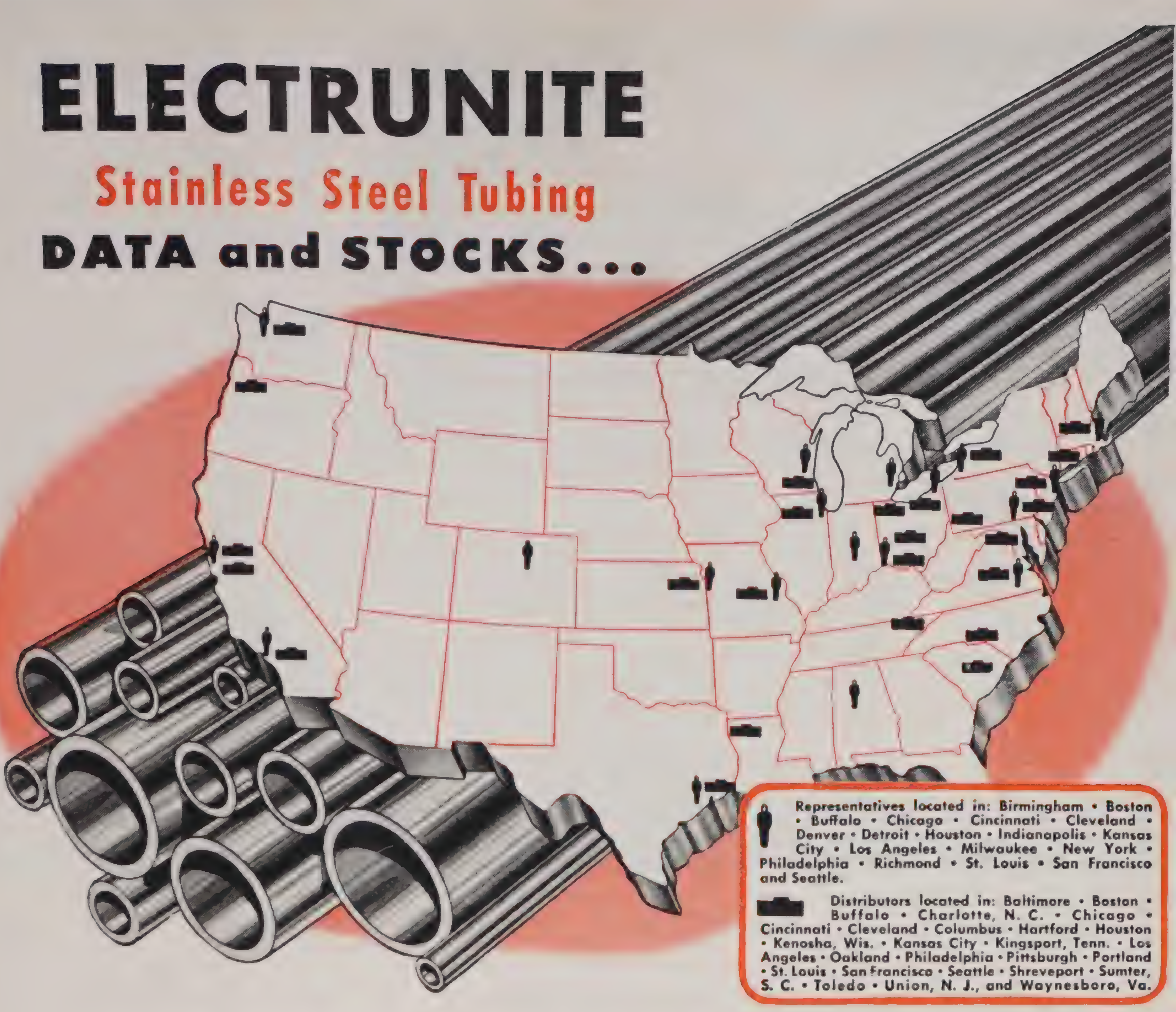
Corrugated aluminum industrial roofing and siding is featured in house organ, *Alcoa Aluminum News Letter, 6-49.* Material is reported resistant to atmospheric corrosion, fumes, and smoke. And it is stated that it does not streak

(Catalogs, Bulletins Continued)

ELECTRUNITE

Stainless Steel Tubing

DATA and STOCKS...



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WHEN AND WHERE YOU NEED THEM!

● Right in your own city—or in one nearby—there's a Steel and Tubes representative ready to give you helpful technical information on stainless steel tubing.

He's the man who can tell you the complete story about ELECTRUNITE Tubing made of Republic ENDURO* Stainless Steel; *why it's always uniform in diameter, wall thickness, concentricity, strength, ductility and workability.* He can advise you, too, on the selection of the proper stainless steel analysis to best meet specific application requirements. And in the same city—or not far away—is your ELECTRUNITE Distributor who can supply you with ELECTRUNITE Stainless Steel Tubing from warehouse or on mill delivery *in both pipe and tubing sizes.* You'll find him always ready to help you in any way possible.

Get in touch with your Steel and Tubes sales representative and your ELECTRUNITE Distributor. They're good men to know. If you would like their names and addresses, write us.

REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION • CLEVELAND 8, OHIO
Export Dept.: Chrysler Bldg., New York 17, N.Y.

*Reg. U. S. Pat. Off.

Republic
ELECTRUNITE
STAINLESS STEEL TUBING

REPUBLIC STEEL

REDUCE MAINTENANCE
AND COSTLY
Cleaning time
PATENTS
PENDING

With a
WATEROUS SANITARY PUMP!

Today dairy and food plants are demanding Waterous. No internal threads in the pumping chamber. No internal shaft to contaminate food products. All liquid contact parts are of stainless steel, quickly removed for easy cleaning.

If it's a 100% Sanitary Pump—it's a WATEROUS

DESIGNED AND MANUFACTURED BY EXPERIENCED ENGINEERS.

Write for Bulletin No. F 143.

Waterous
DEPENDABLE PUMPS
SINCE 1886

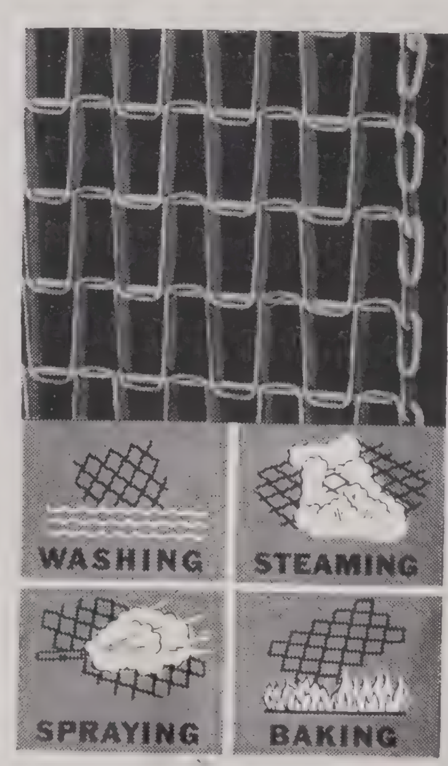
WATEROUS COMPANY
80 EAST FILLMORE AVE.
ST. PAUL 1, MINNESOTA

Continuous processing trims production costs

CYCLONE Metal Conveyor Belts do more than move your product from operation to operation. They permit you to carry out almost any type of processing . . . washing, drying, heating, steaming and the like . . . simultaneously with product movement. The result: important savings of time and labor that add up to sizeable production economies.

Cyclone Metal Conveyor Belts are available in three basic styles . . . Flat Wire (shown), Chain Link and Flex-Grid . . . and in a wide variety of steels, alloys, widths and mesh sizes.

For a conveyor belt that will give long and efficient service under the particular conditions of your job, get in touch with the nearest Cyclone office; they're in most principal cities. Meanwhile, for a description of the complete line of Cyclone Metal Conveyor Belts, write for Catalog No. 4.



CYCLONE FENCE DIVISION (AMERICAN STEEL & WIRE COMPANY)
DEPT. H-99, WAUKEGAN, ILL.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS
CYCLONE METAL CONVEYOR BELTS
UNITED STATES STEEL

or stain adjoining surfaces.—*Aluminum Co. America, 2195 Gulf Bldg., Pittsburgh 19.*

Bottle Labeling

Cooler-proof label glue is reported in Bull tin 15 to have been improved for use bottling plants and breweries on semi- or co pletely automatic labeling machines. Descri tion, properties and directions for use are co ered.—*Paisley Products, Inc., 1770 Canalpo Ave., Chicago 16.*

Corrugated Cartons

Solid-bottom corrugated container, calle Snap-It, is stated in folder to set up for pac ing in 2 sec. without special devices.—*Victor Container Corp., 449 W. 30 St., New Yor City 1.*

Paints and Protective Coatings

Interior paints and enamels, exterior paints primers and undercoaters, metal preservativ paints, and heat fume and chemical resisting coatings are described with illustrations in 32 page catalog.—*Cheesman-Elliot Co., Inc., 639 647 Kent Ave., Brooklyn 11, N. Y.*

Miscellaneous

Bearings

Complete line of bearings is illustrated and described in 38-page booklet.—*Timken Roller Bearing Co., Canton 6, Ohio.*

Cast Nickel Alloy

Advantages of using cast nickel alloy in food processing equipment to reduce wear of acids, cleaning compounds, scratching of sugar and salt, and metal-to-metal deterioration are delineated in 4-page folder.—*International Nickel Co., Inc., 67 Wall St., New York City 5.*

Package and Specialty Printing

Printing and inline fabricating equipment for packaging is illustrated and described in 42-page book.—*Champlain Co., Inc., 88 Llewellyn Ave., Bloomfield, N. J.*

Acrylic Resin Cast Sheeting

Physical and chemical properties of Lucite, suggested uses, and directions for fabrication and maintenance appear in 32-page booklet.—*E. I. du Pont de Nemours & Co., Inc., Plastics Department, Wilmington 98, Del.*

Microscopes and Accessories

Complete line of optical equipment is photographed and described in 207-page hard-covered book. Prices are listed in inserted booklet. —*American Optical Co., Scientific Instrument Div., Buffalo 15, New York.*

Moisture Meter

Rapid electrical method for testing moisture in grains is delineated in Bulletin 1242T. USDA-approved meter eliminates necessity for weighing samples.—C. J. Tagliabue Corp., 614 Frelinghuysen Ave., Newark 5, N. J.

Grease Interception

Where grease is a drain-line problem, information provided in Bulletin G is offered to salvage it. Grease interceptor equipment is described with photos, text, diagrams and specifications in 6-page foldout.—*Josam Mfg. Co., Josam Bldg., Cleveland 13.*

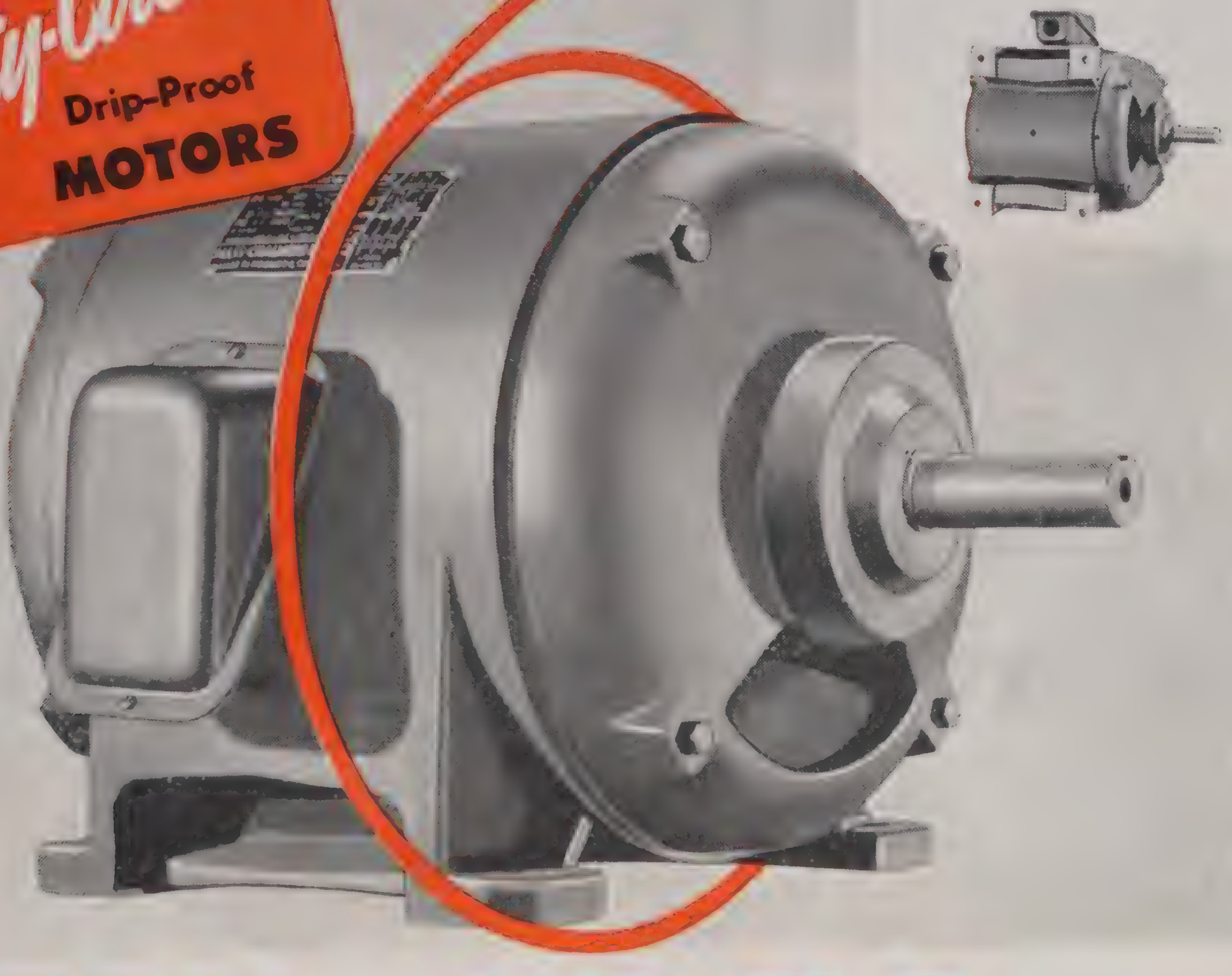
Glass-Fiber Insulation

Thermal and acoustical insulation with blanket-like material made of fine glass fibers is subject of illustrated 8-page booklet. There is section on physical properties.—*Owens-Corning Fiberglas Corp., 221 Nicholas Bldg., Toledo 1, Ohio.*

—End

ALLIS-CHALMERS

"Safety-Circle" Drip-Proof MOTORS



The SAFETY-CIRCLE

The Allis-Chalmers *SAFETY-CIRCLE* is the frame and ends of heavy cast iron that completely surround and protect the working parts of the *SAFETY-CIRCLE* motor.

SAFETY-CIRCLE means

★ All-Around Protection ★ Low Maintenance ★ Dependable Performance

A-2690

THE *SAFETY-CIRCLE* MOTOR IS protected all around against those four great motor killers — corrosion . . . distortion . . . friction . . . foreign matter. The frame is of cast iron, the most corrosion-resistant material for this purpose.

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SAFETY-CIRCLE motors are fully protected inside, too. Multiple-dipped and multiple-baked stator plus extra inter-phase insulation provide extra protection against electrical breakdown.

With *SAFETY-CIRCLE* protection outside and protected working parts inside, you can count on years of trouble-free, low cost power.

For complete details on *SAFETY-CIRCLE* advantages, see your A-C Authorized Dealer or Sales Office or write for Bulletin 51B6210B. Stocked in sizes 1 to 20 hp. *SAFETY-CIRCLE*, *Texrope* and *Vari-Pitch* are Allis-Chalmers trademarks.

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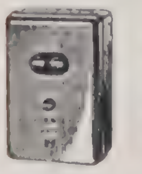
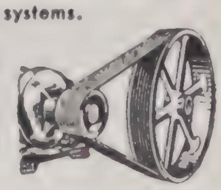


CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

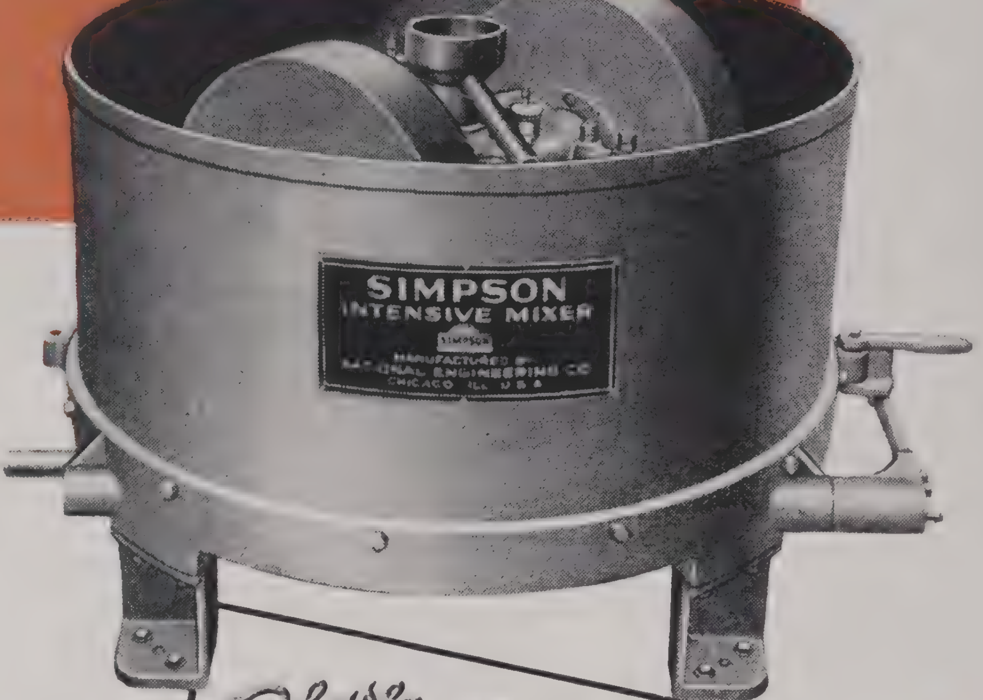


TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

PROBLEM...*How to get thorough, smooth blending of chocolate at lower cost*

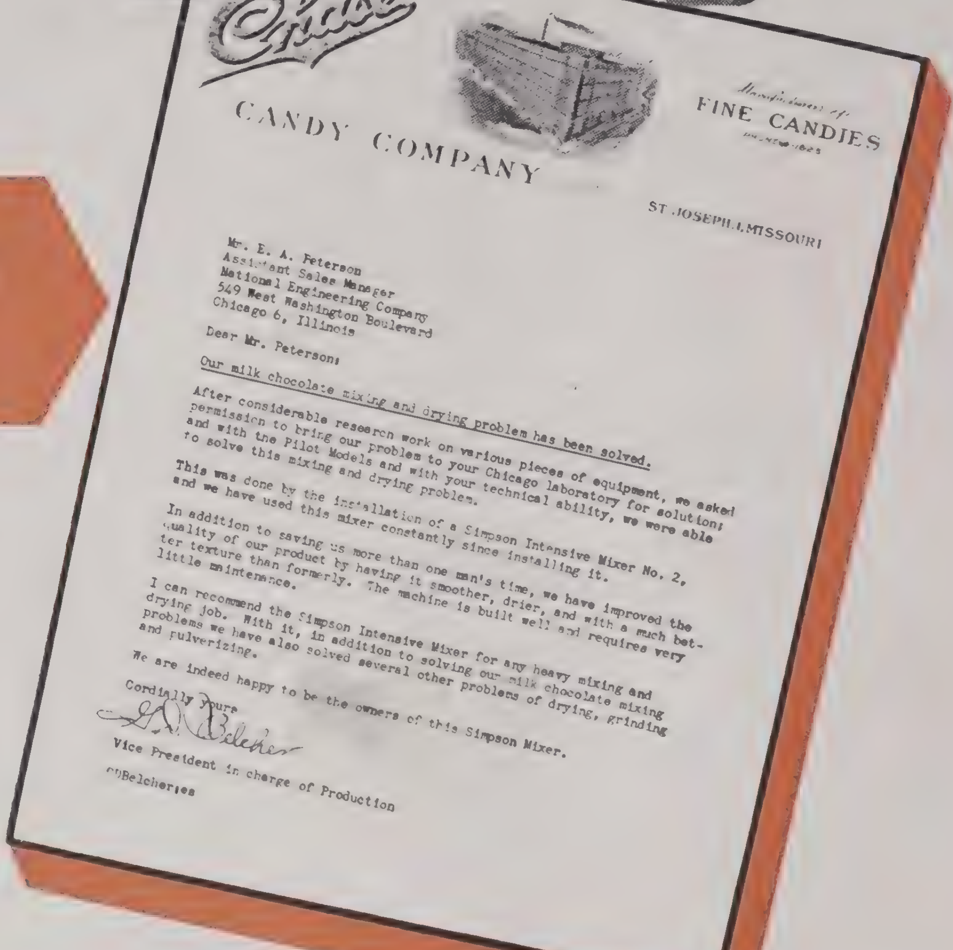
SOLUTION... *use* SIMPSON *Intensive* MIXERS



SMOOTH BLENDING . . . that's the secret of good chocolate. And, that's what results when you follow the example set by many of the leading candy makers in the country who use Simpson Intensive Mixers.

A steady mulling action that resembles rubbing a spoon on the side of a mixing bowl leaves chocolate mixed by the Simpson method "smoother, drier, and better textured." With less labor required, less power used, and the resultant low net cost per batch . . . Simpson Intensive Mixers raise your profits.

PROOF . . . *Read this letter from a typical user.*



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Manufacturers of
FINE CANDIES
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Mr. E. A. Peterson
Assistant Sales Manager
National Engineering Company
549 West Washington Boulevard
Chicago 6, Illinois

Dear Mr. Peterson:

Our milk chocolate mixing and drying problem has been solved.

After considerable research work on various pieces of equipment, we asked permission to bring our problem to your Chicago laboratory for solution; and with the Pilot Models and with your technical ability, we were able to solve this mixing and drying problem.

This was done by the installation of a Simpson Intensive Mixer No. 2, and we have used this mixer constantly since installing it.

In addition to saving us more than one man's time, we have improved the quality of our product by having it smoother, drier, and with a much better texture than formerly. The machine is built well and requires very little maintenance.

I can recommend the Simpson Intensive Mixer for any heavy mixing and drying job. With it, in addition to solving our milk chocolate mixing problems we have also solved several other problems of drying, grinding and pulverizing.

We are indeed happy to be the owners of this Simpson Mixer.

Cordially yours
G. D. Belcher
Vice President in charge of Production

GDBelcher:es

See how one large candy maker feels about Simpson Intensive Mixers. Here is positive proof that these efficient mixers are your best solution for chocolate mixing and drying problems.

Simpson Intensive Mixers are built in a range of sizes from 1/5 to 50 cu. ft. capacity. They are available with stainless steel or neoprene linings, and may be equipped for heating, cooling and for vacuum operation. Let a National Engineer help in solving your mixing problems. Write for full details.

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New Technology

CONTROL EQUIPMENT

Instrument Measures Solids Of Fruit Jam and Honey

A commercial hand refractometer calibrated for sucrose solutions has been adapted to routine field inspection of solids contents of honey and of strawberry jam containing added pectin. The instrument has a correction thermometer which is calibrated in percent sucrose according to the temperature coefficient for the refractive index of sucrose solutions. Since this coefficient differs only slightly from that of honey, the correction thermometer on the instrument can be used with reasonable accuracy, particularly within the temperature range 60-80 F.

Close agreement was found between determinations of honey solids by the vacuum oven method and by the hand refractometer. The equation for 76 samples was $y=1.116x-7.58$, where y is the percent solids by the vacuum oven method and x is the hand refractometer reading. The standard error of prediction is ± 0.4 percent. For the strained juice of strawberry jam, 116 samples gave the following relation between the solids determined by vacuum oven method and hand refractometer: $y = 1.022x-0.79$, with a standard error of prediction of ± 0.3 percent.

Digest from "Measuring the Solids Content of Honey and of Strawberry Jam With a Hand Refractometer," by Jesse A. Pearce and Suzanne Jegard, *Canadian Journal of Research*, Vol. 27F, 99-103, Mar., 1949.

FERMENTATION

Reductones Desirable In Light Beers

Dark beers have greater stability to pasteurization and storage than light beers, the difference being attributed to the dark type's greater content of the reducing substances, melanoidins and reductones. Reductones play a role in oxidation-reduction analogous to that of buffers in hyrogen-ion phenomena—*i. e.*: They enable a system containing them to absorb considerable oxygen without altering the oxidation-reduction potential appreciably. Their desirability in light beers is evident, but it is difficult to get them into light beer wort in adequate amounts for protection against oxidation.

The Indicator-Time-Test (ITT) of Gray and Stone is a measure of reductone content of worts and beers. Its application to malt worts shows that the reductones are developed during the boiling of the wort, but originate in the malt. Freshly filtered wort from ordinary malt has a very low concentration of reductones (large ITT value). Boiling 10 min. reduced the ITT value from 4693 to 2015 sec. and after 2-hr. boiling the ITT was 441. Exposure to the air for 72 hr. increased the ITT to 1,100.

By careful control of malting conditions in a German-patented process, a so-called "rH malt" of unusually high reductone content has been produced. Fresh wort from this malt had an ITT of 2,883 sec., which was reduced to 4 sec. after 2 hr. boiling. The wort was also very stable, 6 days exposure to air increasing the ITT value to only 16 sec.

Since beers with low ITT value are demonstrably more stable than those of high values, the use of such malts in making beer can have an important bearing on beer stability.

Digest from "Reductones in the Brewing Process. The Influence of the Malt on the Protection of Wort and Beer" by E. Schild and M. V. Huymann, *Brauwissenschaft*, 49-55, Apr. 1949.

FREEZING

Freezing Cuts Baking Quality Of Yolks and Whole Eggs

Freezing increases the viscosity of yolks and whole eggs, but does not affect the whites. Mobilometer readings are greatly increased by freezing yolks or whole eggs. But the readings do not change during the storage after freezing.

Rapid freezing keeps the bacteria counts down, and also gives a frozen product of light yellow color. Slowly frozen eggs (110 hr.) were a dark orange. Freezing time does not affect foam volume of whole eggs or whites. Slow freezing reduced the foam volume of defrosted yolk. Two percent salt gave frozen egg products equal in foam quality to fresh eggs.

Storage in the frozen state impaired the baking quality of whole eggs and yolks, as measured by sponge cake volume, for about three months. The quality then improved for a period but a steady decrease in baking quality followed the brief improvement. Whites on the other hand were unchanged in quality.

Thawing of yolks or whole eggs over a 4 hr. period results in better baking quality of the eggs than either a shorter period of 18 min., or longer ones of 24 or 48 hr.

Digest from "Liquid and Frozen Egg. V. Viscosity, Baking Quality, and Other Measurements on Frozen Egg Products," by J. A. Pearce and C. G. Lavers, *Canadian Journal of Research*, Vol. 27F, 231-40, May 1949.

PACKAGING

Special Packaging Material Prevents Discoloration

Deterioration of meat products, fish, eggs and vegetable oils by absorption of light can be prevented by shielding them with a suitable color screen, according to a recent patent. It has been found that the wave lengths of light most harmful to the products mentioned lie in two regions—below 4,900 and between 6,300 and 6,700 Angstrom Units. A color screen which will absorb these rays will inhibit deterioration by photochemical action. Numerous experiments have shown that Malachite green, Monastral green, or Fast green A5832, each

(New Technology Continued)

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FREE Manual FOR THE Asking
Nearly 4,000 TYPES OF DARNELL CASTERS and WHEELS
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with the addition of a suitable yel dye or pigment, will produce a c screen having a spectral absorpt in the regions specified. The c screen may be any of numerous pa aging materials that has been impr nated or coated with the protect dyestuff in desired concentration.

Digest from U. S. Patent 2,461,522, is Feb. 15, 1949, on an application dated Sept. 1946, to Mayne R. Coe, assigned to Rile Filter Process, Inc., Pinehurst, N. C.

DAIRY

Diacetyl in Cheddar Cheese

A small quantity of diacetyl pr ably contributes to the typical fla of Cheddar cheese. Larger amoun however, are associated with fla defects.

Twenty-eight lots of Cheddar che and 8 lots of other varieties w examined for flavor by a judgi panel, and divided into two grou Diacetyl content of each lot w determined by a modification of t Prill & Hammer method, in whi the ammono-ferrous dimethylglyo mate formed was measured spectr photometrically.

Diacetyl was found in all l examined—the majority containi less than 0.05 mg. per 100g. of chee Diacetyl content of Cheddar che ranged from 0.016-0.335 mg. Sevent nine per cent of the lots in the gro with "excellent flavor" contained l than 0.05 mg. diacetyl.

Digest from "A Study of the Diacetyl Cheese. I. Diacetyl Content and Flavor of C dar Cheese," by H. E. Calbert and W. V. Pr *Journal of Dairy Science*, 515-20, June 1949.

Modified Milk Products

Methods of modifying the compo tion of cow's milk to approximate composition of human milk, wh preserving the natural taste and co of cow's milk, are disclosed in a rec patent. One method involves sepa tion of cow's milk into cream a skim milk, treatment of the latter remove a substantial part of its mine and acid constituents, recombining two portions by homogenizing, a subjecting the resulting mixture whatever heat treatment may required for sterilization, concent tion, and prevention of rancidity storage.

Minerals and acid are removed fr skim milk or whey by passing th through beds of resinous ion excha media. This treatment can be repea until any desired reduction in mine content is obtained; for examp until only 2-3 percent of the to solids content is ash. The remain

(*New Technology Continu*

ARMSTRONG'S
Insulator
VOLUME 18 · NUMBER 5
Saving Heat in Hot Water Equipment
Steel Mills Make More Than Steel
Mobile Freezer Follows the Crop
Tomato Storage And Ripening
Piping of Hot Viscous Fluids
A New Fiberglas— Lighter More Efficient

For men who work with heat or cold

"Armstrong's Insulator" is a bimonthly magazine published by the Armstrong Cork Company as a service to men who work with high, medium, and low temperatures. Much of the editorial material contained in the "Insulator" is developed from Armstrong's work in the solution of problems involving the use of insulations to control heat and cold.

The list at the right of this page will give you an idea of the variety of subjects discussed in recent issues. Some were comprehensive reports on an entire industry or a new method of using heat or cold. Others were engineering articles, outlining with facts and drawings the technical details of good insulation practice.

If you would like to read any of these articles, we will be glad to send you the copies of "Armstrong's Insulator" in which they appeared. Just write to Armstrong Cork Company, 4209 Concord Street, Lancaster, Pennsylvania.

ARTICLES FROM RECENT ISSUES OF "ARMSTRONG'S INSULATOR"

LOW TEMPERATURE

- Synthetic Fiber Manufacture
- Fur Farm Cold Rooms
- The Meat Industry
- Eyeglass Lens Production
- Seed Storage
- Tomato Ripening and Storage
- Railroad Car Freezer
- Freezers on Trawlers
- Manufacture of Insulin
- Hotel Chefs' Kitchens
- One Story Bakery Design

LOW-TEMPERATURE EQUIPMENT

- Refrigerated Display Cases
- Automaton Selling
- The House Trailer Industry
- What's Happening in Refrigerators
- Medical Storage Cabinets
- Dry Ice for Trailer Routes
- Ice Cream Trucks

HEAT INSULATION

- Insulation of Steam Traced Lines
- Piping of Hot Viscous Fluids
- Steel Mill By-Products
- Central Station Steam
- Cork as A Heat Insulation
- Should Hot Flanges Be Insulated
- Insulating Dual Purpose Lines

INSULATING REFRACTORIES

- Designs for Home Pottery Kilns
- Enamelling Furnaces for Lustron Homes
- Soaking Pit Dampers
- Controlled Atmosphere Furnaces

CONSTRUCTION AND MAINTENANCE

- Converting Coolers to Freezers
- Refrigeration Losses Through Freezer Doors
- Floor Drain Constructions
- Temporary Erection of Insulation
- Cold Room Tracking
- Right and Wrong Insulated Construction
- Ventilation under Freezers

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Complete Contract Service
For All Temperatures

From 300° Below Zero

To 2800° Fahrenheit

CUT PROCESSING COSTS
CRUSHING — PUREEING — JUICING
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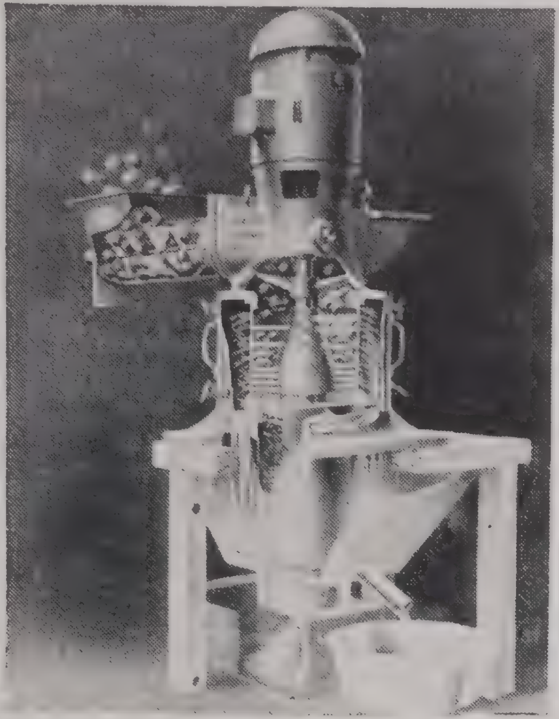

Separation and Disintegration at the Same Time

The cutaway shows the principles applicable to many processes for separating disintegration-resistant material from the usable or desired product concurrent with hi-speed pulping or pulverizing.

Write for our Bulletin No. 520 for detailed data on applications in the Food Industry.

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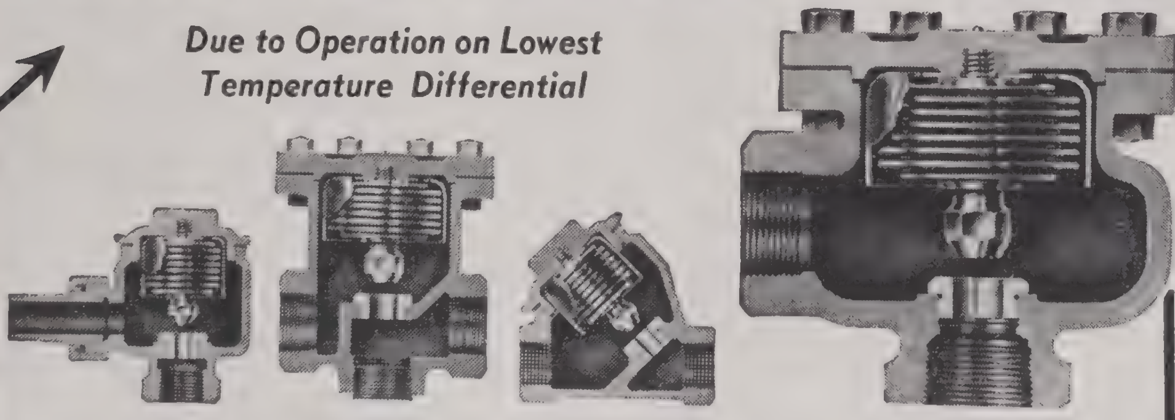
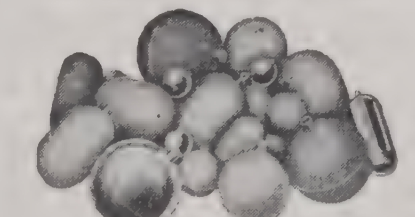
EQUIPMENT FOR THE FOOD AND CHEMICAL PROCESS INDUSTRIES
441 Folsom St. Representatives in Principal Cities San Francisco, Calif.

Nicholson Steam Traps
STOP WATERLOG LOSS
Due to Operation on Lowest Temperature Differential



Repeated comparative tests by large users of traps show that Nicholson traps operate on lowest temperature differential: 5° to 15°, depending on trap size and steam pressure. Production of cooking kettles, for example, has been increased as much as 30% because fast action of Nicholson traps keeps equipment full of live steam. They are specified for all apparatus where back-up of condensate causes corrosion or damage to thin gauges. 5 types for every application; size ¼" to 2"; press. to 225 lbs.



HIGH-PRESSURE FLOATS Stainless, monel, steel or plated steel. Welded. In all sizes and shapes; for operating mechanisms and as tanks or vessels. 2-day delivery. BULLETIN 348.

BULLETIN 1047 or Food Industries Cat.

W. H. NICHOLSON & CO., 193 Oregon St., Wilkes-Barre, Pa.

is principally lactose, 85 percent, and non-casein protein, 11-12 percent.

Whey thus modified is combined with 12 percent butterfat cream and homogenized. The mixture can be concentrated for canning or spray drying.

Digest from U. S. Patent 2,465,907, issued Mar. 29, 1949, on an application dated June 6, 1945, to R. E. Meade and P. D. Clary, Jr., assigned to Western Condensing Co., San Francisco.

FISH

Bacterial Spoilage in Fish

A test for trimethylamine is not likely to prove a very sensitive measurement for bacterial spoilage in fresh fatty fish. It seems probable that the flesh of certain fish contains a substance, or substances, tending to prevent formation of trimethylamine by inhibiting the bacterial enzyme responsible for its formation.

These were conclusions drawn from studies at the Pacific Fisheries Experiment Station. Fresh red cod and lingcod, and defrosted red spring salmon and chum salmon were washed, filleted and minced. Effects of different pH's were determined by treating samples with dilute acid or alkali. Tests made were: Direct bacterial counts, colorimetric determination for trimethylamine, and an acidity examination. Results are recorded in the article.

The salmon samples exhibited a marked rancid odor and the red astacin pigments were badly bleached. This indicated that development of rancidity is just as important as, or possibly more important than, formation of trimethylamine in causing quality deterioration.

Digest from "Effect of Flesh Acidity or Bacterial Numbers and Trimethylamine in Spoiling Fish," by H. L. A. Tarr and P. W. Ney, *Progress Reports of the Pacific Coast Stations*, Vancouver, B. C. 11-13, April, 1949.

CONFECTIONERY

Non-Drip Chocolate Cherries

Chocolate cherries molded so that they can be eaten without drip comprise the subject of a recent patent. Bottom of the mold in which the chocolate shell is formed has an annular shoulder and a depression, the latter forming a projection of solid chocolate on the finished confection. After solidification of the chocolate shell in the mold, a cherry is placed in the depression, the desired liquid is added, and the bottom portion of the finished confection is formed by

(New Technology Continued)

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SERVICE

Hooking up 100 kw, 2400 v. generator after h. v. test

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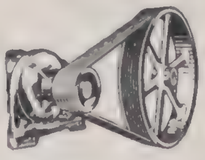

TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

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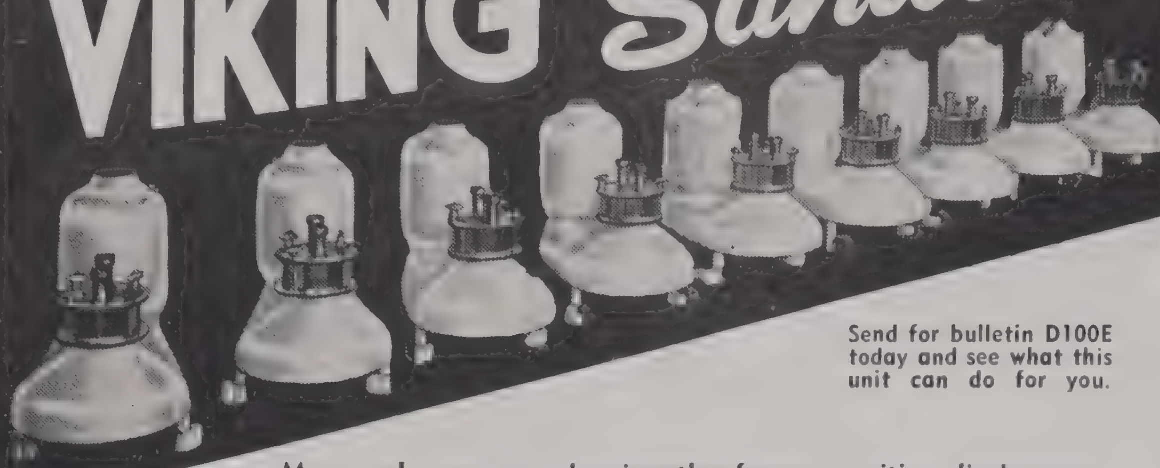

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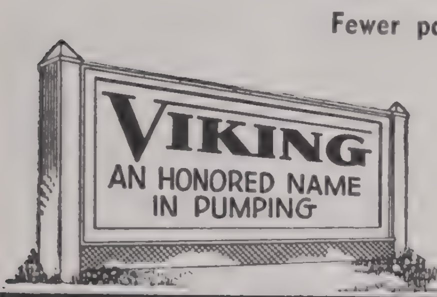
More and more are choosing the famous positive displacement Viking "Sanitor"—the unit with the "Gear within a Gear" principle. It moves the liquid without splashing or pounding and answers the need for finest sanitation.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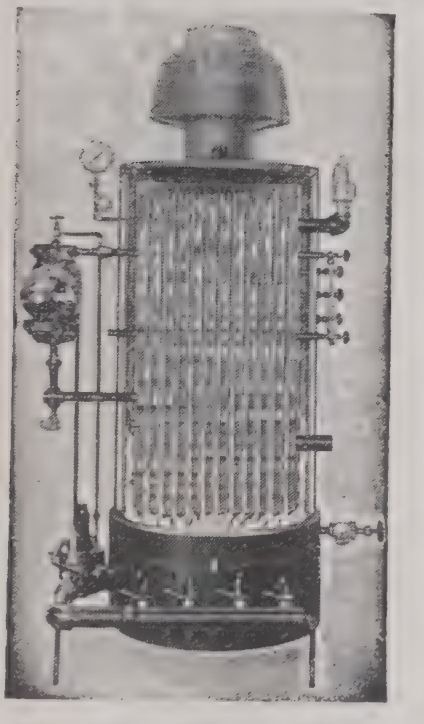
Cedar Falls, Iowa

OVER 4 DECADES' EXPERIENCE ARE BACK OF . . . *the Kane Boiler Package*



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FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE

pouring chocolate onto the surface the liquid. When the cooled confectio is removed from the mold it has projecting top portion which can b bitten off, and the liquid content con sumed without dripping.

Digest from U. S. Patent 2,461,399, issue Feb. 8, 1949, on an application dated June 18 1946, to Herbert Strausser, New York City.

Candy Chewing Gum

Chewing gum in a new form that is stable against oxidative and atmospheric deterioration is described in a recent patent. Instead of mixing sugar into the molten gum base, the cold or hot gum base is added to a hot syrup of sucrose and glucose that has been cooked until plastic. Flavoring is added after the mixture has cooled to about 150 F. Cream of tartar or corn starch may also be added. After the mixture is made, it is extruded in any desired shape. The product is a homogeneous emulsion of gum base in sugar, with the external appearance of smooth, glistening boiled candy.

Digest from U. S. Patent 2,460,698, issued Feb. 1, 1949, on an application dated March 7, 1946, to E. G. Lindhe, Hastings on Hudson, N. Y., and assigned to Sweets Laboratories, Inc., New York City.

FATS AND OILS

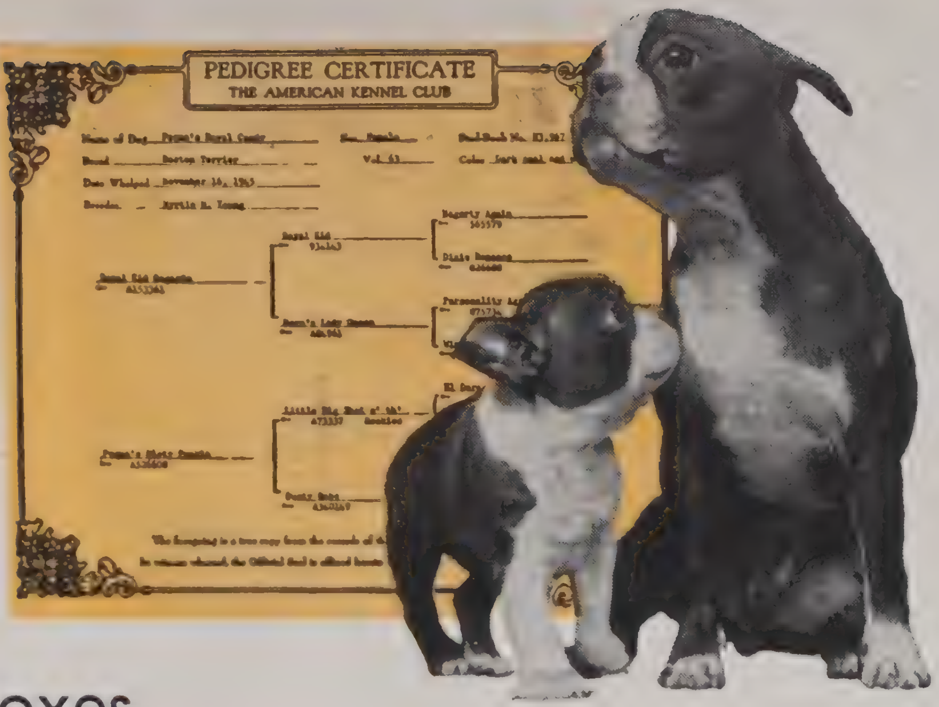
Bleaching Vegetable Oils

Laboratory investigation has been made of the effect of temperature, time of contact, and particle size on the activity of several adsorbents for bleaching refined cottonseed and soybean oils. The adsorbents were of 3 general classes: Acid-activated clays, natural earths, and materials high in silica content. A color measurement system was devised involving measurement of the transmittance of light of 475 millimicrons wave length through the oil. Effect of temperature was obtained in the form of temperature-bleach color curves based on the treatment of 100g. oil with 2 percent by weight of the adsorbent, heated to different temperatures. Preliminary tests indicated that little change in color occurs after 15 min., and subsequent runs were made for this period. Effect of particle size was determined with 5 samples of Tamms silica ground to different sizes.

Based on adsorbent activity, acid activated clays were found to be 1½-2 times more effective as bleaching agents than natural earths. Each adsorbent was found to have maximum bleaching activity at some particular temperature. For acid-activated clays,

(New Technology Continued)

The Boston Terrier was bred in Boston about sixty years ago from English Bulldog and white English Terrier stock. This little fellow is exceptionally lively and bright, and truly deserves the title of "American Gentleman."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THE AMERICAN KENNEL CLUB

When You Buy Boxes
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MAKERS of famous brand-name products cannot afford to gamble on corrugated containers. They must have a box that will carry their product safely from factory to dealers' shelves all over America.

That is why Stokely-Van Camp pack Stokely's Finest canned vegetables, dinner table favorites of millions, in Union boxes—the boxes with a pedigree.

75 years of leadership in kraft packaging stands behind Union boxes. Every step in the making, from timber to finished box, is quality-controlled by one management in America's largest pulp-to-container plant.

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Stokely's FINEST FOODS
8 OZ.
48/8 OZ
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CERTIFICATE OF BOX MAKER
THIS BOX CONFORMS TO ALL CONSTRUCTION REQUIREMENTS OF CONSOLIDATED FREIGHT CLASSIFICATION
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TOLEDO SCALES

Ever weigh

the advantages of investment protection?

To anyone considering the choice of modern weight control, the name Toledo Scale needs no introduction. Their reputation has been established along lines of accuracy and dependability of product and they seek the same reputation in the products and services which they purchase. That's why "Automatic" Sprinkler fire protection was specified at the time construction of their modern Toledo, Ohio, facilities was initiated.

While the technical advantages of "Automatic" Sprinkler fire safety are of prime consideration, the financial aspects involved in this particular installation cannot be denied. The unsprinklered insurance rate for this seven million dollar valuated property would exceed $198,000.00 annually. The present "Automatic" Sprinklered rates are less than $6,000.00 annually, and fire protection in this case was paid for out of savings, in less than one year.

This is an excellent example of the manner in which "Automatic" Sprinklers convert an existing expense into a capital asset (INVESTMENT PROTECTION). It's substantial reason why business executives everywhere are ordering "Automatic" Sprinklers for both old and new construction. They look upon them as their first line of fire defense and recognize their value as *an important investment today . . . perhaps welcomed protection tomorrow.*

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO

TYPICAL "Automatic" Sprinkler PROTECTED PROPERTIES

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"Automatic" FIRE-FOG
provides positive protection for severe fire hazards

"Automatic" Sprinkler
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maximum activity was in the range 212-223 F. The natural earths had a range of 244-269 F., and the high silica materials a range of 356-482 F. The last is high for use in the edible oil industry.

Digest from "Factors Influencing Vegetable Oil Bleaching by Adsorption," by L. E. Stout, D. F. Chamberlain and J. M. McKelvey, *Journal of the American Oil Chemists' Society,* Vol. 26, 120-126, March, 1949.

Antioxidant for Fats

A method of preventing oxidation in edible fats and oils, both animal and vegetable, is revealed in a recent patent. The inventor uses the leaves and stems of the desert creosote bush, *Larrea divaricata,* in preference to nordihydroguaiaretic acid which is extracted therefrom, and which is known to inhibit oxidation of certain animal fats. NDGA, however, has little effect on vegetable oils, and is unstable to heat.

The advantage of using the whole leaves and stems rather than the extract lies in the fact that the former contain other oil-soluble substances, mainly tannic acid, and that the combination gives prolonged stability to edible fats. In practice, an animal fat such as lard, or a vegetable oil such as cottonseed, is mixed with from 0.01–0.15 percent of ground leaves and stems of the creosote bush, heated under reduced pressure and blown with steam in the usual manner for deodorizing fats and oils. After filtration, the material is ready for chilling and filling into containers. The product has keeping qualities superior to those obtained with NDGA.

Digest from U. S. Patent 2,457,741, issued Dec. 28, 1948, on an application dated Oct. 15, 1945, to J. R. Shipner, South Omaha, Neb., and assigned to The Cudahy Packing Co., Chicago.

STORAGE

Protection of Frozen Eggs From Bacterial Growth

Results of a 3-yr. study of the growth of bacteria in frozen eggs are presented under three headings: Effect of cleanliness on frozen egg quality, optimum freezer and storage temperatures, and proper defrosting methods.

Tests showed that clean eggs with sound shells and good interior quality are essential to production of liquid egg products of low bacterial content. Breaking plant equipment should be cleaned at least four times a day. Pasteurization of liquid egg products will kill more than 99 percent of bacteria present; and prompt freezing after preparation will prevent bacterial multiplication.

(New Technology Continued)

Continuous Insect Control for Food Plants

This "ENTOLETER" Centrifugal Machine protects doughnut mix ahead of packing

THE BEST WAY to safeguard food products and ingredients from insect infestation is to have the continuous protection of "ENTOLETER" Insect Control.

Insect control, to be truly effective, must be a continuous process . . . it must destroy all stages of insect life in free flowing dry materials: eggs, larvae, pupae and adults. This is an important advantage of the "ENTOLETER" System. Simply installed, its mechanical action gives a complete and continuous kill.

"ENTOLETER" Control protects incoming materials, materials before and after storage, and your finished products before packaging. By destroying all insect life, the threat of insect multiplication is eliminated, and food materials are protected from adulteration by insect excreta.

NEW BULLETIN describes important applications for "ENTOLETER" Centrifugal Machines. Whether or not you now have "ENTOLETER" equipment, you can benefit from the information in this folder. Send for your copy today.

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Results of freezing and storage tests indicated that liquid egg placed in a freezer at zero F. cooled quickly to 28, and remained liquid until the latent heat was removed. Then it froze, the temperature dropping quickly to that of the freezing room. Ten-pound cans of whole egg froze in about 60 percent of the time required for 30-lb. cans. A mild blast of air directed against the 30-lb. cans reduced the freezing time about 50 percent. Storing frozen egg products at zero deg. F. for several months killed as many bacteria as storage at lower temperatures. Bacterial destruction was most rapid during the first few weeks of storage; and about 90 percent of the bacteria were destroyed during a 6-month freezing and holding period.

Defrosting tests showed that frozen yolk defrosted faster than whole egg, and whole egg faster than white. The 30-lb. cans defrosted in 20—24 hr. immersed in running tap water at 58 F.; in 36—42 hr. in still air at room temperature of 68 F.; and in 20—26 hr. under a mild air blast at room temperature. Shaking the cans while defrosting shortens the time and keeps bacterial count low. Bacteria increased in nearly all cans during the first 24 hr. of defrosting, fastest in yolk, slowest in white; but increase was less marked in cans defrosted in running water than in cans held at room temperature.

Digest from "Frozen Egg Quality Depends on Clean Eggs, Clean Equipment, Clean Cooking," by A. R. Winter and C. Wrinkle, *The U. S. Egg and Poultry Magazine*, 7-9, 18-19, Jan., 1949. "Fast Freezing at Low Temperatures Protects Frozen Egg Quality," ibid., 20-23 and 30-31, Feb., 1949. "Proper Defrosting Methods Keep Bacterial Counts Low in Frozen Egg Products," ibid., 28-31, Mar., 1949.

MISCELLANEOUS

Action of Nitrogen Trichloride

Progress has been reported in isolating the toxic factor in proteins treated with nitrogen trichloride, known to produce convulsions in dogs and rabbits. Starting material for the purification experiments was powdered zein treated with NCl_3 at the level of 5.5 mg. per g. The toxic factor was then concentrated by digestion of the treated zein with pancreatin, followed by dialysis and extraction of the dialysate successively with hot, water-saturated *n*-butanol and cold phenol.

The phenol-soluble material is hydrolyzed by refluxing with HCl. Excess acid is removed by evaporation, and the residue is dissolved in water. It is extracted with hot butanol, and decolorized with charcoal activated with acetic acid. The decolorized acid

(*New Technology Continued*)

FINDINGS OF FACT CONFIRM HIGH VALUE OF ENRICHMENT

ENRICHMENT has been elevated to a new high level of national and social significance. The far-reaching Newfoundland Nutritional Surveys* have decisively demonstrated the part that flour and bread enrichment can play in reducing infant mortality, lowering the tuberculosis death rate and over-all death rate, decreasing signs of malnutrition, and increasing the alertness of children and grownups alike.

BEFORE ENRICHMENT

The first of these large-scale fact-finding surveys was conducted in 1944. Signs of malnutrition were widespread. Infant mortality and tuberculosis death rates were two to three times as high as in similar populations. Enrichment with thiamine, riboflavin, and niacin was then put into effect.

AFTER ENRICHMENT

Four years later, in 1948, the second survey showed a dramatic reduction in signs and symptoms related to deficiencies of these essential nutrients. Gone to a great extent was the apathy so noticeable in 1944. Deaths from tuberculosis had decreased sharply, and the rate of stillbirths and infant deaths was strikingly reduced.

> *"Nutrition . . . has its significance in its relation to health. Health is defined in the World Health Constitution as follows: 'Health is the complete state of physical, mental and social well-being, not just freedom from disease and infirmity.'*
>
> *"What can nutrition do? It can prolong life, give better bodies; make people happier, give them greater economic status; provide opportunity for greater social significance."*
>
> *—National Health Assembly, May 1-4, 1948*

NEWFOUNDLAND

A CHALLENGE AND OPPORTUNITY

Here is a clear-cut confirmation of the high value of bread and flour enrichment to the national health. Here is a challenge to America's milling and baking industries, which have the enviable opportunity of bringing more buoyant health and greater physical and mental vigor to the people of America—through ENRICHMENT.

**These surveys were supported by the Newfoundland Government, the Newfoundland Tuberculosis Association, the individual investigators, and Merck & Co., Inc.* (The Canadian Medical Association Journal, *March 1945 and April 1949.*)

MERCK VITAMIN PRODUCTS
FOR ENRICHMENT AND FORTIFICATION

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For Millers, Bakers, Cereal and Macaroni Manufacturers Merck Enrichment Ingredients · Merck Vitamin Mixtures for Flour Enrichment · Merck Bread-Enrichment Wafers · Merck Vitamin Mixtures for Corn-Products Enrichment · Merck Vitamin Mixtures and Wafers for Macaroni Enrichment. Merck *Knows* Vitamins.

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Alva IMITATION Maple

Without the help of advertising campaigns or promotional ballyhoo, the sales record of ALVA MAPLE has shown a persistent increase year after year from the time of its introduction over 30 years ago. This is a success story based on MERIT alone. ALVA MAPLE is preferred throughout all phases of the food industry by bakers, confectioners, ice cream makers, extract and syrup manufacturers—the armed services, too, ordered ALVA MAPLE in great quantities because of its outstanding goodness. A sample of ALVA MAPLE is ready for you — write for it — test and compare it ***on merit alone.***

Alva

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315 FOURTH AVENUE, NEW YORK 10

solution is brought to 95 percent acetone concentration, when the toxic factor is distributed between the gummy precipitate and the soluble fraction. The former is dissolved in water, electrodialyzed in a three-compartment cell, and the material from the middle compartment applied to a resin exchange column.

On elution with ammonia, the toxic factor is eluted in a broad band following proline and extending to the point of ammonia break-through. When the toxic band is treated on columns of silica gel, using phenol as solvent, toxic material is obtained both from the first fraction eluted and from the slower-moving fraction.

Digest from "Action of Nitrogen Trichloride on Proteins: Progress in the Isolation of the Toxic Factor," by H. R. Bentley, E. E. McDermott, J. Pace, J. K. Whitehead and T. Moran, *Nature*, Vol. 163, 675-76, April 30, 1949.

Fumigating Dried Fruit

Methyl bromide is a fumigant for dried fruit that distributes itself quickly, penetrates well, and leaves little residue in or on the fruit. In an experimental fumigation chamber 50 x 17 x 10 ft., 110 tons of South African and Australian raisins and currants were treated with 17 lb. of methyl bromide, or at the rate of 32 oz. per 1,000 cu. ft. Boxes were stacked with 2 in. spacing between tiers and fumigation chamber was equipped with a fan for circulating the methyl bromide.

Circulation made very little difference either in the final distribution of methyl bromide in the atmosphere of the chamber or in the bromide residues in the fruit. Most of the fumigant leaves the fruit during the first 24 hr. after the chamber is opened, and it is safe to start unloading the chamber within 2 hr. after opening, if circulating fans are kept in operation continuously.

Unfumigated dried fruit contains about 6 ppm. of bromine; fruit fumigated with methyl bromide about 13 ppm. immediately after fumigation, and about 9 ppm. after 4-5 days. It has been shown that 56-94 ppm. of bromide in the diet of rabbits is without notable effect.

An exposure of 13 oz. per 1,000 cu. ft. for 24 hr. should be adequate for fumigating dried fruit in boxes with methyl bromide. The time could probably be reduced to 10 hr. if the dosage were maintained at not less than 300 oz./hr. per 1,000 cu. ft.

Digest from "Application of Fumigants t Ships and Warehouses. VI. Fumigation o Dried Fruit with Methyl Bromide in Chambers," by A. B. P. Page, O. Lubatti and J. Russell, *Journal of the Society of Chemical Industry*, Vol. 68, 102-8, Apr. 1949.

—End

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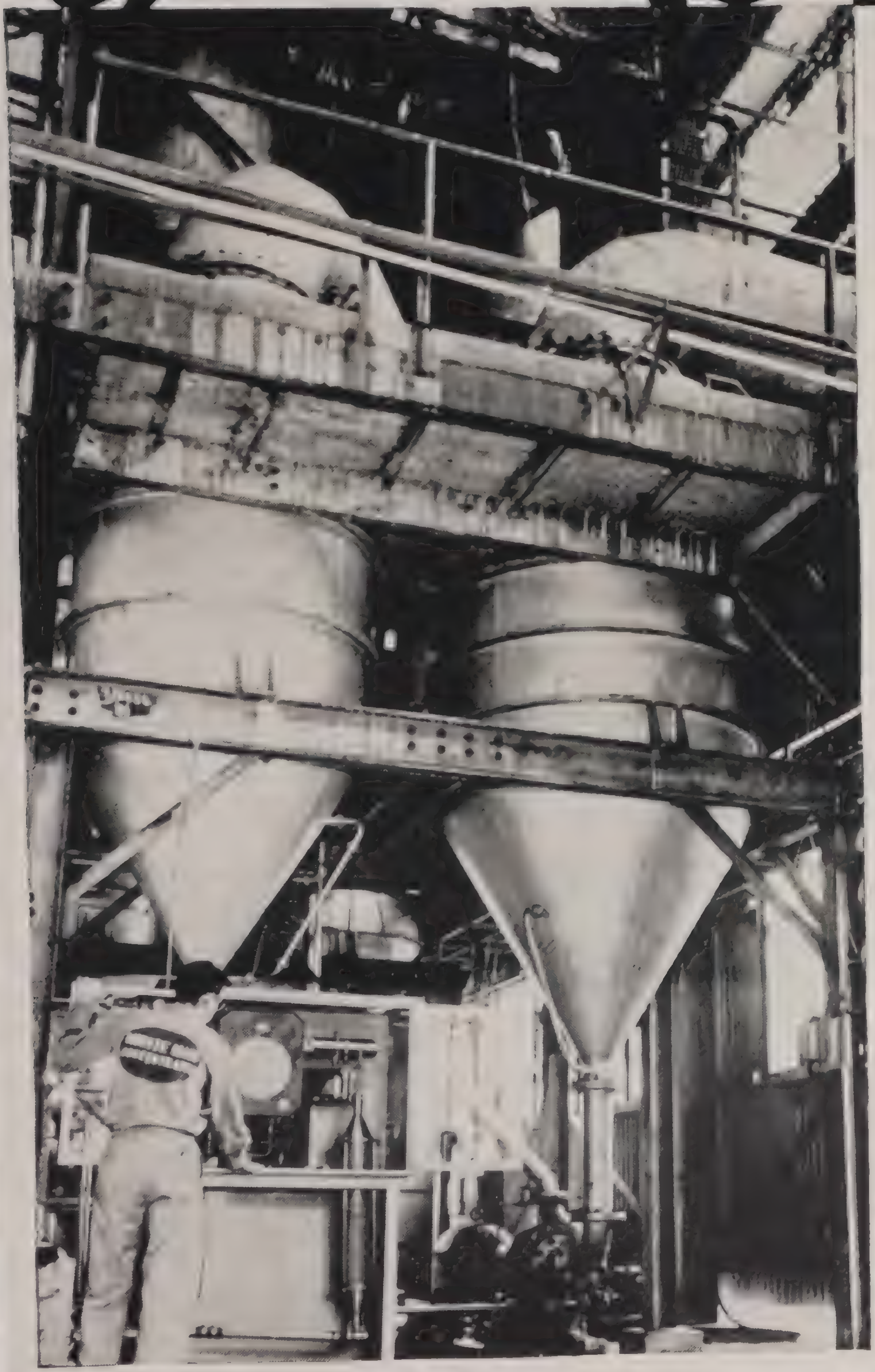
...LAST AND ALWAYS WITH BUFLOVAK LOW TEMPERATURE EVAPORATORS



You *must* safeguard the good qualities of your concentrated product, you say to yourself—First, last and always. BUFLOVAK knows your problem on that score, and meets your need with its new Low-Temperature Evaporator. At no time during the processing of even the most delicate materials does it "tamper" with the product's qualities, even when the Evaporator is run over long operating periods. And, always, there is a high recovery of solids. Think of the savings you realize in this feature alone!

Profits are increased, also, by maintaining high product quality continuously, at low production costs.

BUFLOVAK'S Low-Temperature Evaporator has already established its value in plants where installed.

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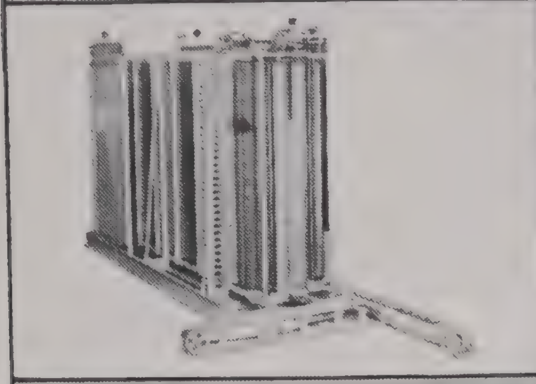

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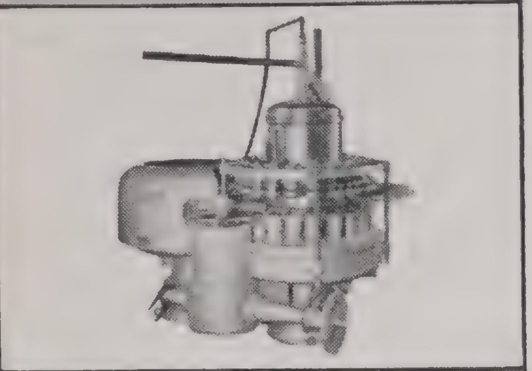

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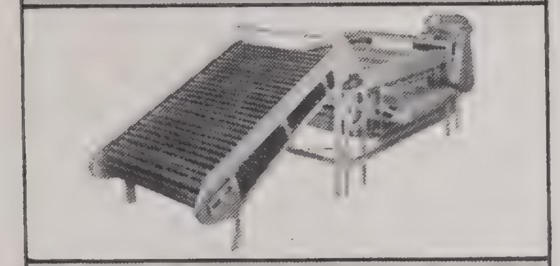
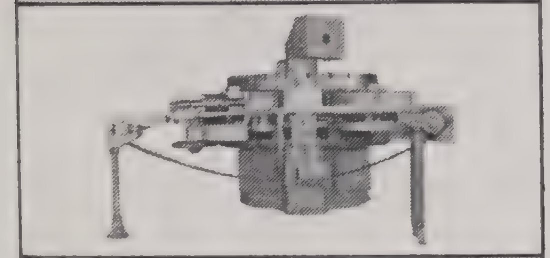


FMC Tri-Roller Sizer



FMC 24-Pocket Weight Checker

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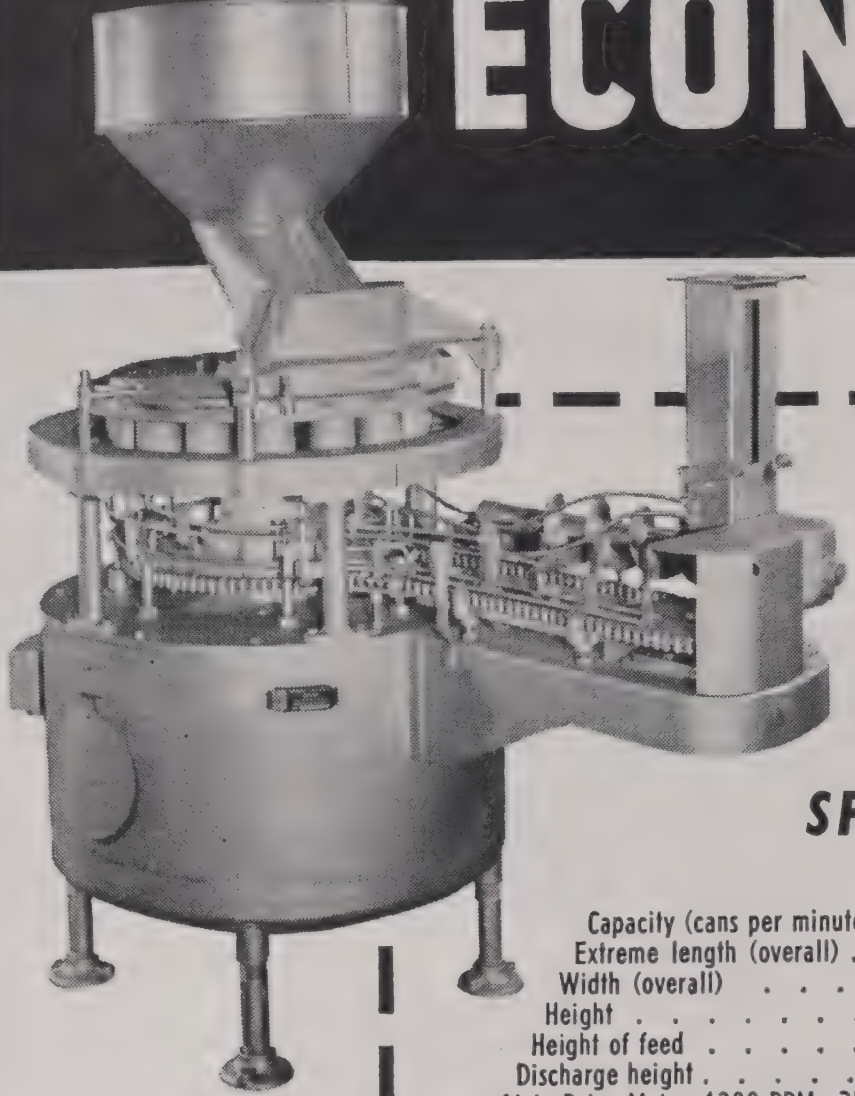

100 SERIES SPECIFICATIONS

Capacity (cans per minute)	75-250
Extreme length (overall)	67-3/16"
Width (overall)	46-13/16"
Height	80¾"
Height of feed	62⅛"
Discharge height	30"
Main Drive Motor	1200 RPM., 3Ph., 60Cy., 220/440 V., ½ HP.
Vibrator Motor	1800 RPM., 3Ph., 60Cy., 220/440 V., ¼ HP.
Net weight in pounds	1,745
Export shipping weight	2,470
Cubic feet	121 (app.)
Can sizes	8 oz. — full gallon

FMC
100-Series "UTILITY" Fillers

Cut labor cost, speed up your output, end product waste, and insure uniform top quality of your pack . . . with FMC 100-Series "Utility" Fillers.

"No Can—No Fill" feature prevents waste of product when can is not at receiving end of discharge pocket.

Can Vibrator settles contents of can without use of plungers, thus avoiding spillage and at the same time preventing injury to the fill.

Chain Propulsion carries can positively from feeding position to closing machine.

Adjustable Fill enables you to vary the volumetric capacity of filling pockets while machine is in operation.

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Books

Vegetable Oils

Proceedings of a Six-Day Short Course in Vegetable Oils; Their Production, Processing, and Uses. *Sponsored by the American Oil Chemists' Society, conducted by University of Illinois, Urbana, Aug. 1948. 187 pages, mimeo. $4. (Order from A. O. C. S., 35 E. Wacker Drive, Chicago 1).*

Brought together here under one cover is authoritative information on the production, processing, and utilization of vegetable oils. It is material that heretofore has been either unavailable in the literature or found with great difficulty.

Shorts for Busy Executives

Worker Morale and Productivity *(35 pages)*; Personnel Functions and the Line Organization *(31 pages)*; New Controls for Fixed and Variable Costs *(39 pages)*; Administrative and Statistical Techniques of Quality Control *(34 pages)*; Building Worker Interest in Production Problems *(34 pages)*; Organizational Teamwork in Production *(32 pages)*; Cost Controls for Packing, Shipping and Warehousing *(31 pages)*; A Primer on Basic Types of Shipping Containers and Interior Packing Pieces *(24 pages). All published by American Management Assn., 330 W. 42nd St., New York City 18. Price, 75c. ea.*

These pamphlets on various management and production problems are highly recommended for the busy executive who has little time to devote to full scale studies of the problems implied in the titles.

All About Sugar

Sugar. *By Andrew Van Hook. Published by The Ronald Press Co., 15 E. 26th St., New York City 10, 1949. 155 pages; 6 x 8½ in.; cloth. Price, $3.*

Growers, processors, refiners, chemists and brokers will find this comprehensive sugar treatise a valuable study and a ready reference.

Covered are the chemistry of sugar, the various stages in the production and refining of cane and beet sugar, and commercial and trade aspects of the industry—emphasizing the economics and the world situation of sugar. The byproducts of sugar, also sugar's history from ancient times to the present, form chapters of interest to the food chemist.

Tables and illustrations add to the presentation which, while necessarily technical in spots, is well within the comprehension of the interested layman.

International Control of Sugar, 1918–1941. *By B. C. Swerling. Published by Stanford University Press, Stanford, Calif., 1949. 69 pages; 6x9 in., paper. Price, $1.*

On its historical treatment alone, this little book would bear reading by members of the food industry. But it also covers the economic angles of sugar production, and such important aspects of the subject as the structure of international sugar trading, the sugar agreements of 1931 and 1937, Cuba's role in world sugar, and factors in international sugar control.

World Data

Yearbook of Food and Agricultural Statistics—Vol. I, 1948. *Published by Food & Agriculture Organization of United Nations, 1201 Connecticut Ave. N. W., Washington 6, D. C. Volume I "Production". 285 pages; 8x11 in.; paper. Price $3.50.*

Global acreage and production data of principal agricultural crops, including production of livestock and livestock products, are now available for years up to and including 1947. This yearbook was established in 1947 by FAO to carry on the work formerly done by International Institute of Agriculture at Rome.

The 1948 edition, expanded in scope and improved in several respects over the 1947 volume, deals primarily with production statistics.

A second volume, to be available later this year, will cover international trade in food and agricultural products.

Government Publications

Government Specifications Lists. Government purchasing activities are guided by a series of specifications most readily obtainable by reference to the lists published periodically, with changes between issues shown by cumulative supplements published monthly or quarterly. Recommended for technical guidance in food industries are three lists, obtainable as follows: 1. Federal Specifications Index. Bureau of Federal Supply. Price 40 cents. The current list of Federal Specifications which constitutes Sec-

(Books Continued)

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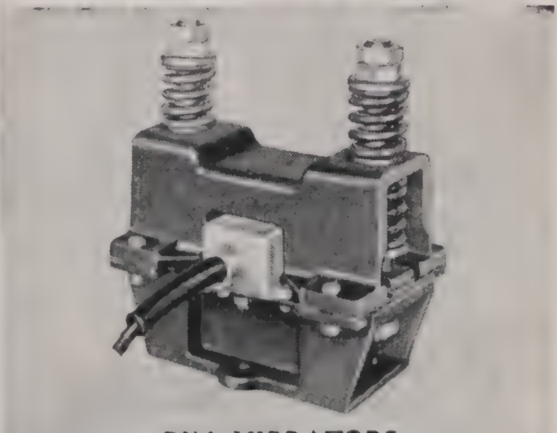

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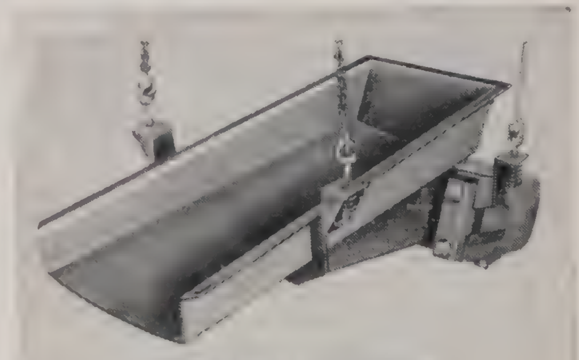

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tion IV of the Federal Standard Stock Catalog is available in a booklet revised to Jan 1, 1949. Quarterly supplements may be obtained from Bureau of Federal Supply.

2. United States Army Index of Specifications (Including NME (JAN) Standards). January 1949. Price $1.50 (subscription includes monthly supplements).

3. Index of Specifications Used by the Navy Department. Part I. April 1, 1949 (Revised to March 15, 1949). NAVSANDA Publication No. 62. Requests for copies should be directed to Bureau of Supplies and Accounts, Navy Department, Washington 25, D. C. This index is issued quarterly.

Making American Cheddar Cheese of Uniformly Good Quality from Pasteurized Milk. *By H. R. Lochry, et al. Bureau of Dairy Industry. BDIM-Inf-73. Mimeographed.* A condensed summary of recommended factory procedure from milk procurement through packaging and grading.

Dried Ice-Cream Mixes. *By Donald H. Williams and Frank E. Potter. Bureau of Dairy Industry. BDIM-Inf-74. Mimeographed.* A very brief summary of the typical commercial formulas and types used in the war.

Directions for Determining Particle Size of Aerosols and Fine Sprays. *By A. H. Yeomans. Bureau of Entomology and Plant Quarantine. ET-267. Mimeographed.* A discussion of methods of experimental measurement.

Developing & Selling New Products. *By Gustav E. Larson, Department of Commerce. Price 25 cents.* A guidebook for manufacturers intended to "reduce the risk involved in the development and sale of new products."

Market Diseases of Fruits and Vegetables–Potatoes. *By G. B. Ramsey, et al. Department of Agriculture. Miscellaneous Publication No. 98. Mimeographed.*

Price Programs of the U. S. Department of Agriculture, 1949. *Compiled by H. W. Henderson. Department of Agriculture. Price 15 cents.* Gives an analysis of problems and a discussion of methods in catechism form.

The above documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated the pamphlet is free and should be ordered from the bureau responsible for its issue. —End

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- WALLS AND FLOORS
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In the Food Industry, the importance of using only the best in sanitizing methods cannot be over-emphasized.

In Roccal, the *original* quaternary ammonium germicide, the food industry is offered a sanitizing agent that is laboratory controlled and tested. The uniform quality of Roccal means uniformly good results in doing a proper sanitizing job.

Roccal is a powerful germ-killer. In recommended dilutions, it is non-poisonous, virtually odorless and tasteless. It is non-irritating to the skin and no more corrosive than plain water.

Roccal can be used for every sanitizing job in processing and packaging in the following food industries: milk, cream, ice cream, butter, cheese, egg breaking, sugar, fish, poultry, fresh frozen vegetables and fruits, meat products, cereal products, candy and beverage, wherever the product comes in contact with equipment Also to keep walls and floors sanitary.

Start using Roccal today—you'll find that better sanitation is good business.

Fortify all your milk with DELTAXIN® — The purest known form of Vitamin D_2

SPECIAL MARKETS—INDUSTRIAL DIVISION

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Roccal
SANITIZING AGENT
10% SOLUTION
ONE GALLON
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WHAT ARE YOU PAYING *for Condensate?* $ $ $ $

If your steam heated equipment is not supplied with hot, dry steam kept in intimate contact with the heated surface and free from air, you are paying for fuel that is being thrown away every hour.

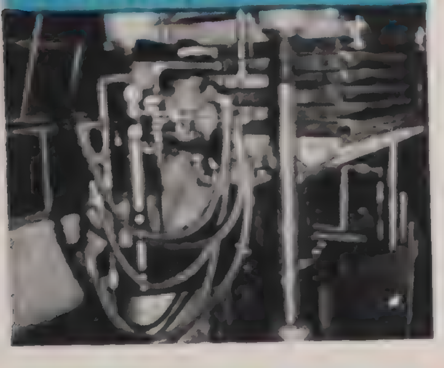
Worse yet, you are paying double in lost production and rejects, if your equipment is not properly trapped and vented.

AUTOS

$ LOST TIME

Heating up time was reduced from 3 hours to 1 by using Sarco No. 9 Thermostatic Traps on enamel ovens in a large auto body plant. This trap has large air venting capacity. Removes condensate at 10°F below steam temperature.

PLASTICS



$ REJECTED GOODS

With seven platens on this large plastics press, the weakest link (one cold section) made rejects frequent and without notice. Now seven Sarco Bucket Traps kick out the condensate and provide trouble-free production. This trap is ideal for releasing condensate as quickly as it forms—a must on plastics presses.

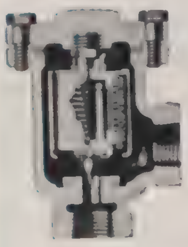
GREENHOUSE

$ LOST FUEL

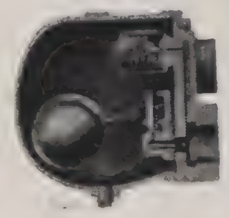
Most manufacturers don't know how much fuel they are losing due to inefficient trapping. In greenhouses, where fuel is a large part of the cost, monthly fuel bills tell the story fast. This greenhouse saved 30% of the fuel and 60% of the make up water by using Sarco Thermostatic traps on every line and every coil.

FOUR TYPES OF SARCO STEAM TRAPS TO CHOOSE FROM

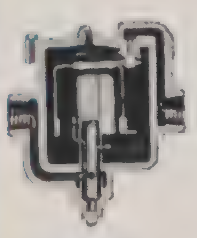
Sarco makes all accepted types and can fit the trap to the job. Ask for trap selection chart No. 1600.



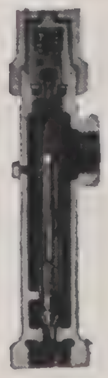
THERMOSTATIC



FLOAT-THERMOSTATIC



BUCKET



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✓ That's why we think it's such sound business for you to check with Continental before making any decision affecting your supply of cans.

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Patents

Bread Dough Mechanically Shaped Into Spheres During Passage Through Spiral Channel While in Contact With Inner Surface of Rotating Inverted Cone—*C. B. Seem, to Dutchess Tool Co., Inc., Beacon, N. Y.* No. 2,461,929. Feb. 15, 1949.

Packaged Soup Mix Made to Consist of Amino Acid and Carbohydrate Base With Initial Moisture Content Not to Exceed 1.5 Percent, and Third Edible Ingredient With Initial Moisture Not to Exceed 8 Percent and Capable of Taking Moisture From Other Ingredients Sealed in Moisture-Tight Container—*S. L. Galvin, to Continental Foods Inc., Hoboken, N. J.* No. 2,468,744. May 3, 1949.

Dark-Colored Oil and Fat Stocks Bleached by Treatment With Acidic Phosphoric Compound in Presence of Silicate Radical Containing Inhibitor—*L. F. Henderson and L. Libby, to Lever Bros. Co., Cambridge, Mass.* No. 2,468,753. May 3, 1949.

Peanuts, Cottonseed, and Soya Oils Hydrogenated at 130 to 250 Deg. C. in Presence of Nickel Catalyst Containing 1.38 to 5 Percent Sulphur Under 5 to 100 lbs. psi. Hydrogen—*N. W. Ziels and W. H. Schmidt, to Lever Bros. Co., Cambridge, Mass.* No. 2,468,799. May 3, 1949.

Protein Separated by Fractional Extraction—*E. J. Cohn, to Research Corp., New York City.* No. 2,469,193. May 3, 1949.

Grain Dried While Falling Through Heated Chamber Over Inclined Bed Plates Fitted With Multiplicity of Spaced Baffle Plates to Assure Exposure of Grain to Heated Atmosphere—*G. Wood and J. Mahon, Cheltenham, Eng.* No. 2,469,424. May 10, 1949.

Fatty Acids Converted to Mixed Esters—*F. A. Strauss, to E. F. Drew & Co. Inc., New York City.* No. 2,469,446. May 10, 1949.

Casein Dispersions Made Substantially Free From Bubbles by Application of 25 In. of Mercury Vacuum, Agitating for 30 Min., Adding Caustic Soda Solubilizing Agent and Gradually Heating to 170 Deg. F. With Mild Agitation—*J. R. Calhoun and T. M. Buzzo, to The Borden Co., New York City.* No. 2,469,546. May 10, 1949.

Chocolate Slabs Melted by Positioning Below Pair of Spaced Electrodes to Which Radio Frequency Energy is Supplied—*H. Ashworth, Baldwin and P. W. Doblin, Brooklyn, N. Y.* No. 2,469,709. May 10, 1949.

Chewing Gum Base Made to Contain Prolamine Base, Dibasic Calcium Phosphate, Lecithin and Glycerine-Water Solution—*W. P. Cohoe, to American Chicle Co., New York City.* No. 2,469,861. May 10, 1949.

Fruits and Vegetables Preserved by Coating With Wax Emulsion Containing 0.5 to 3.0 Percent of Fungicidal Agent, Orthophenyl phenol, Diphenyl, Sodium Salt of Ortho phenylphenol and Mixtures—*W. A. Bridgeman, to S. C. Johnson & Son, Inc., Racine, Wis.* No. 2,469,914. May 10, 1949.

Poultry Defeathered While Passing On Overhead Conveyor Along Predetermined Fixed Path Past Mechanical Picking Station—*E. M. Davis, to Swift & Co., Chicago.* No. 2,469,953. May 10, 1949.

Potatoes Cooked in Water, Converted Into Mash, Mixed With Dry Powdered Edible Starch and Extruded In Form Suitable for Rapid and Uniform Drying Followed by Baking—*M. C. Schaul, London, England.* No. 2,469,995. May 10, 1949.

Mildly Acid Fermented Cereal Beverages Clarified of Proteinase by Treating With Dilute Alkaline Solution of Lignin Material—*J. S. Wallerstein and R. T. Alba, to Wallerstein Co., Inc., New York City.* No. 2,470,006. May 10, 1949.

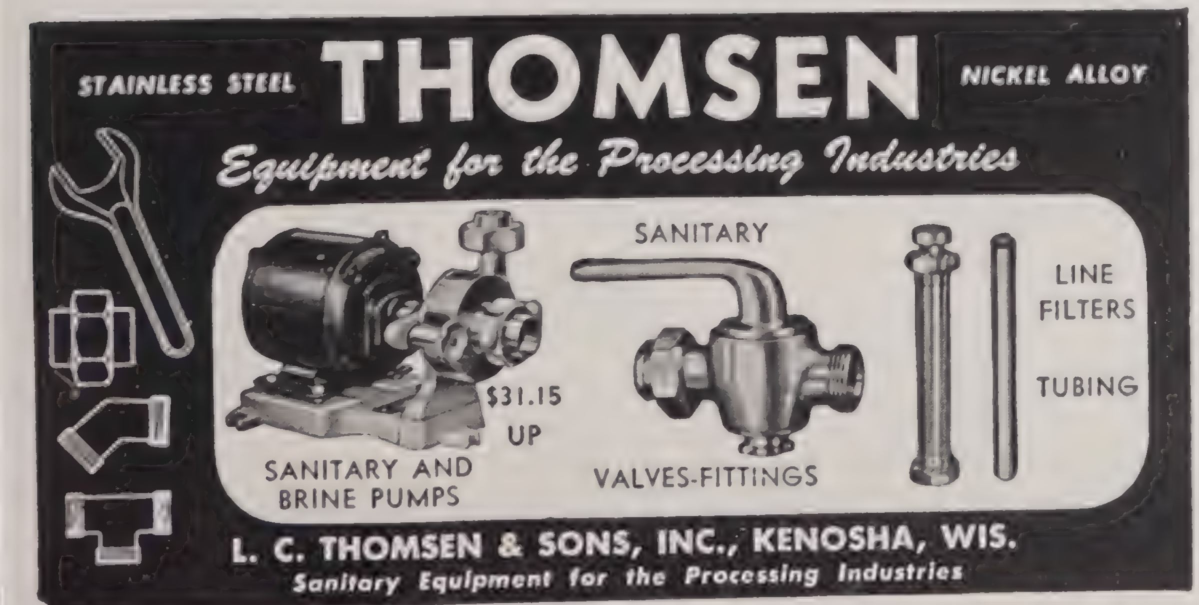
Homogenized Milk Quick-Frozen in Package at −20 Deg. F.—*F. L. Crowley, to Crowley's Milk Co., Inc., Binghamton, N. Y.* No. 2,470,020. May 10, 1949.

Sugar Cane Juice Clarified By Hot Lime Juice Sedimentation and Decantation During Passage Through Series of Superimposed Compartments—*G. T. Warren and R. A. Jordan, to Dorr Co., New York City.* No. 2,470,076 May 10, 1949.

Backbone Mechanically Removed From Fish—*A. L. Christiansen, Willowbrook, Calif.* No. 2,470,289. May 17, 1949.

Sugar Liquor Simultaneously Clarified and Defecated by Treatment with Phosphoric Acid and Calcium Hydroxide in Presence of Filter Aid to Permit Pumping of Liquor Through Filtering Medium Under Pressure—*A. R. Bollaert and Gordon G. Halvorsen, to Great*

Patents Continued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Bag Closing Machines

Lakes Carbon Corp., Chicago. No. 2,470,332. *May 17, 1949.*

Vegetables Washed in Solution Containing Water, Alkali Metal Carbonate and SO_2 with pH Between 5.0 and 6.0 to Retard Decomposition—*D. Alvos, Guadalupe, Calif.* No. 2,470,424. *May 17, 1949.*

Frozen Foods Packaged in Container Fitted With Exposed Moisture-Absorbent Layer on Inner Face of Cover—*F. L. Broeren, G. E. Wauda and R. Kuehl, to Marathon Corp., Rothschild, Wis.* No. 2,470,465. *May 17, 1949.*

Fish and Animal Oils Extracted to Obtain Vitamin Content—*C. J. Kern and J. M. Tabor, to American Home Products Corp., New York City.* No. 2,470,703. *May 17, 1949.*

Tough Husks of Carob Seeds Removed, and Germ Separated, by Treatment Under Steam Pressure of 20 to 100 Psi. in Presence of Softening Agent—*B. Chiego, Newark, N. J.* No. 2,470,750 and 2,470,751. *May 24, 1949.*

Cereal Doughs and Batters Nutritionally Fortified With Assimilable Iron by Addition of Ferrous Sulphate and Sodium Iron Pyrophosphate or Ferric Orthophosphate—*T. F. H. Clark, to Winthrop-Stearns, Inc., New York City.* No. 2,470,804. *May 24, 1949.*

Yeast Mixed With Diatomaceous Silica, Filtered, Dried and Finely Ground Before Extraction of Stable, Biologically Active Proteinaceous Substances—*D. K. Alexander, Dolbeau, Quebec, Canada.* No. 2,470,967. *May 24, 1949.*

Vegetables Canned With Wash Water From Which Suspended Impurities Have Been Removed—*G. C. Scott and R. E. Altman, Deceased, Le Sueur, Minn.* No. 2,471,170. *May 24, 1949.*

Blood Vessels in Animal Liver Tenderized by Proteolytic Enzyme Without Affecting Liver Tissue—*L. S. Paddock to Swift & Co., Chicago.* No. 2,471,282. *May 24, 1949.*

Citrus Cannery Waste Chemically and Mechanically Treated to Produce Bulky, Highly Absorptive Food Product—*D. B. Vincent, to Dan B. Vincent, Inc., Tampa, Fla.* No. 2,471,363. *May 24, 1949.*

Dry, Stable Salad Dressing Mix Consisting of Powdered Shortening, Dried Egg Yolk and Condiments to Be Made Into Fluid Dressing—*M. H. Kimball, C. G. Harrell and R. O. Brown, to Pillsbury Mills, Inc., Minneapolis.* No. 2,471,434. *May 31, 1949.*

Prepared Mix Ingredient Consisting of Fat Globules and Egg Fractions Enclosed in Gelatinized Starch and Sugar—*M. H. Kimball, C. G. Harrell and R. O. Brown, to Pillsbury Mills, Inc., Minneapolis.* No. 2,471,435. *May 31, 1949.*

Mildly Acid Fermented Cereal Beverages Treated With Lignin Solution to Precipitate Protein Constitutents Which Cause Chill-Haze—*R. T. Alba and J. S. Wallerstein, to Wallerstein Co., Inc., New York City.* No. 2,471,474. *May 31, 1949.*

Shell Eggs Partially Dried and Frozen for Storage—*S. A. Kaloyereas, to Louisiana State U. and Agricultural & Mechanical College.* No. 2,471,626. *May 31, 1949.*

Sugar Added to Prevent Darkening in Lemon and Lime Juices Dried by Freezing—*E. W. Flosdorf, to Lyophile-Cryochem Corp., Baltimore, Md.* No. 2,471,678. *May 31, 1949.*

(Patents Continued)

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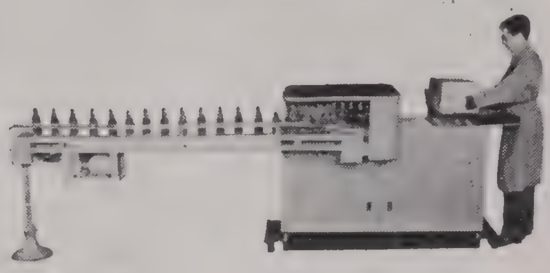

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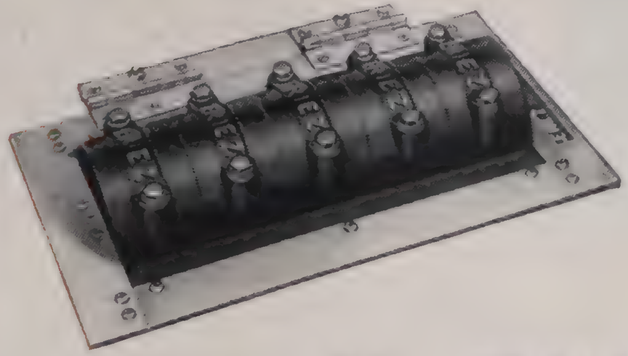

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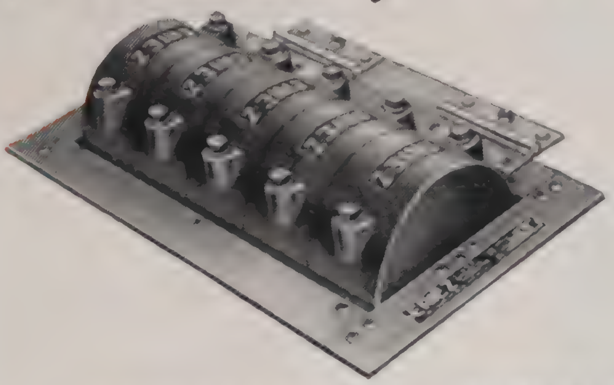

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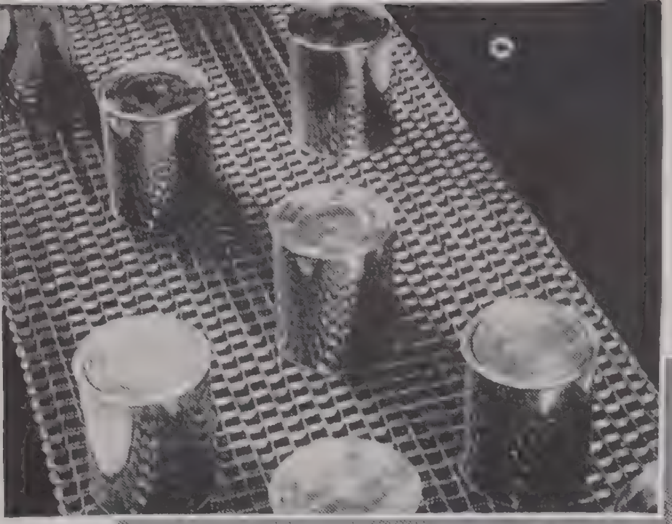

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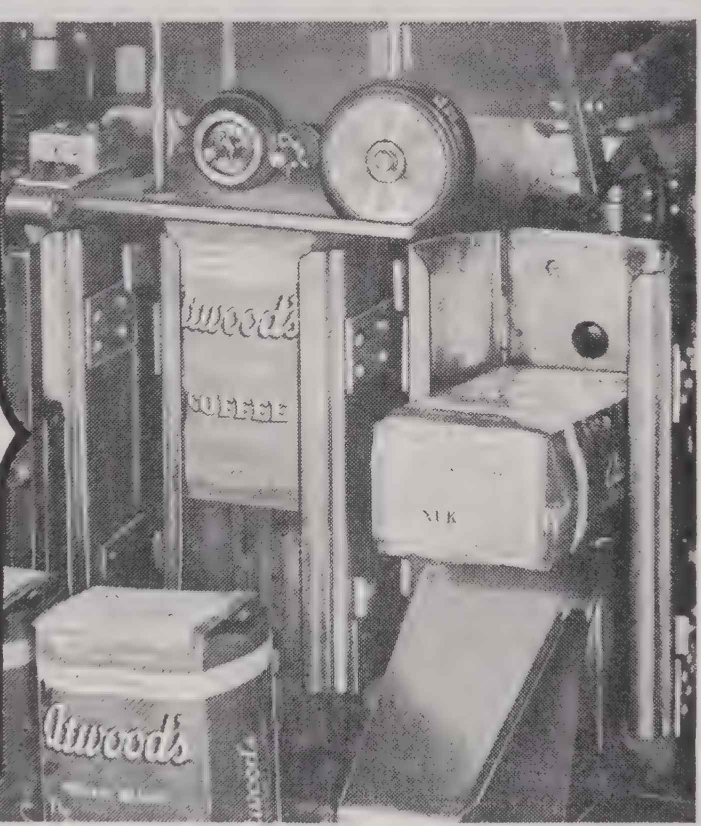

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Orange Juice Dried by Freezing—*E. W. Flosdorf, to Lyophile-Cryochem Corp., Baltimore, Md.* No. 2,471,677. May 31, 1949.

Marshmallow and Like Aerated in Continuous Mechanical Manner—*F. S. Nanna, North Lake Village, Ill.* No. 2,471,769. May 31, 1949.

Essential Oils Recovered From Citrus Cannery Waste Press Liquid by Heating to 215 Deg. F. to Precipitate Scale Formers and Volatilize Essential Oil Content During Flash Spraying Into Flash Tank—*G. N. Pulley, to Feed Products Laboratories, Inc., Lake Alfred, Fla.* No. 2,471,893. May 31, 1949.

Fresh Fruits and Vegetables Given Surface Heat-Treatment in Presence of Acetic Acid to Inhibit Enzymic Discoloration When Exposed to Air—*F. L. Iungerich, to William Peche, St. Louis.* No. 2,472,017. May 31, 1949.

Butter Stabilized Against Rancidity and Decolorization by Tetrachloro-parabenzoquinone—*W. S. Mueller, to U. S. A.* No. 2,472,119. June 7, 1949.

Ground, Roasted Coffee Decaffeinated With Organic Solvent Preliminary to Extraction for Making of Water-Soluble Powder—*J. Ornfelt, to American Home Foods, Inc., New York City.* No. 2,472,121. June 7, 1949.

Egg White Added to Beer During Racking to Control Acidity—*A. H. Hughes, to Arthur Guinness Son & Co., Ltd., Dublin, Eire.* No. 2,472,252. June 7, 1949.

Banana Pulp Freed From Starch by Progressive Heat-Treatment from 98 Deg. F to 160 Deg. F. Under Low Pressure to Increase Enzymic Activity—*C. Ermert, Cincinnati.* No. 2,472,289. June 7, 1949.

Cereal Grains Enriched With Natural Vitamins by Steeping in Extract From Different Variety of Cereal Grain—*E. G. Huzenlaub, to Mars and Huzenlaub, Chicago.* No. 2,472,426. June 7, 1949.

Potatoes Coated With Wax Emulsion Containing Methyl Ester of Alpha Naphthalene-Acetic Acid to Inhibit Shrinking and Sprouting During Storage—*J. F. P. Newhall, to S. C. Johnson & Sons, Inc., Racine, Wis.* No. 2,-472,775. June 7, 1949.

Cereal Grains Cracked During Passage Through Machine Equipped With Disk Rotor Having Smooth Periphery and Grooved Sides—*J. W. Thomas, to Thomas, Stone & French, Inc., Wichita, Kan.* No. 2,472,780. June 7, 1949.

Starch Paste Thinned by Enzymic Action—*J. P. Casey, to A. E. Staley Mfg. Co., Decatur, Ill.* No. 2,472,790. June 14, 1949.

Caffeine Recovered From Organic Solvent Extract of Coffee Products—*C. R. Bender, to General Foods Corp., New York City.* No. 2,472,881. June 14, 1949.

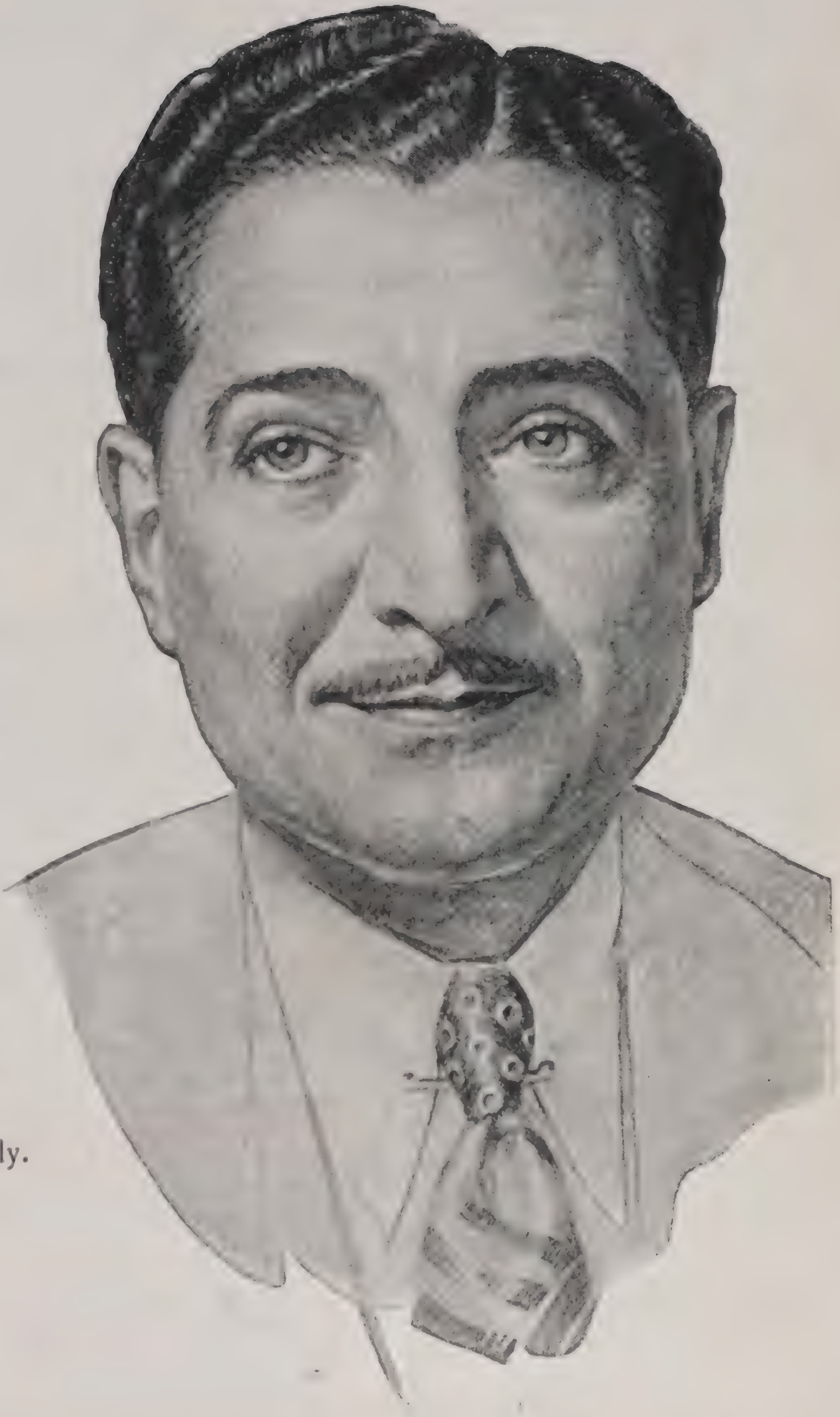
Canned Foods Heat-Treated and Cooled in Retort Designed to Admit Compressed Gas to Compensate for Reduced Steam Pressure During Cooling Operation—*E. J. Hanna to Taylor Instrument Companies, Rochester, N. Y.* No. 2,472,970. June 14, 1949.

Corn Kernels Immersed in Caustic Alkali Solution to Soften Hulls and Tip Caps Before Hulling—*D. W. Hanson, to A. E. Staley Mfg. Co., Decatur, Ill.* No. 2,472,971. June 14, 1939.

—End

"Good PACKAGE DESIGN starts from the INSIDE OUT"

Says industrial designer
FRANK GIANNINOTO
(Nationally known for his outstanding package designs)



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NUMBER THREE
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COMPILED FROM SIXTY-ONE YEARS OF SPECIALIZED EXPERIENCE IN SEPARATIONS

Problem:
To recover clean mica from low grade ore.

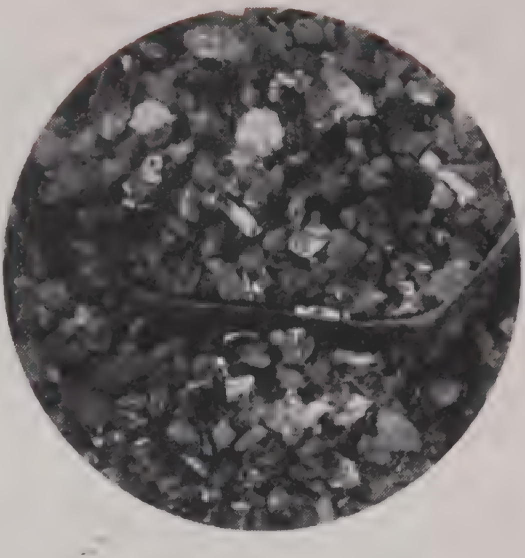
Solution:
S S & S Process—Air-Flotation:

Here is photographic evidence* illustrating another successful application of *separation by specific gravity through air-flotation.*

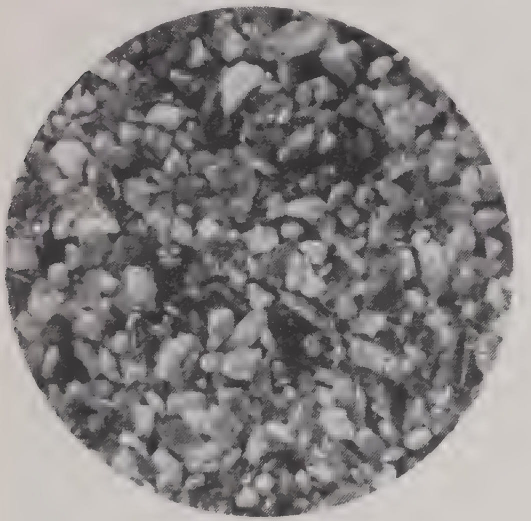
The efficiency with which Sutton equipment was used here to recover clean mica from material composed of mica and gangue also emphasizes the engineering and economical feasibility of applying the S S & S Process for the *separation of virtually any type of dry granular particles from a component of varying bulk density.*

Check into your *own* plant operations with imagination. Sutton equipment is doing a big job for virtually every type of industry. It could be your answer, too.

**Unretouched photographs taken during pre-delivery tests.*



"CRUDE AS RECEIVED" *was composed of mica and gangue. Bulk of the material ranged from ¾" down to −8 +20 mesh.*



PRODUCT NO. 1, *consisting of gangue particles, was separated out at the "heavy" end of the Specific Gravity Separator deck.*

PRODUCT NO. 4 *consisted of large clean particles of mica, and was removed at the "lighter" end of the Separator deck.*

LITERATURE AVAILABLE

Tell us about your separating problem. Let us check it against our testing laboratory records which cover hundreds of successful separations. In the meantime, we will forward literature giving a general description of the SS&S Process. Address information to:

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QMC's Choice

—*Continued from page 81*

receiving areas within the warehouse. They use chlordane powder or chlordane emulsion, and thus prevent contamination of the various supplies already stored.

9-Step Cycle

The entire fumigation cycle takes about 4 hr., broken down in the following manner: (1) Loading the chambers, 20 min.; (2) drawing 28 in. of vacuum, 10-15 min.; (3) introducing the fumigant, 3-5 min.; (4) maintaining the gas in the chamber, 180 min. or overnight; (5) opening the vacuum-breaker valve (the first air-wash), 2-5 min.; (6) pulling a second vacuum to a minimum of 23 in. or a maximum of 25 in., 8-10 min.; (7) reopening the vacuum-breaker valve (the second air-wash), 2-5 min.; (8) opening the valve to the exhaust fan, starting the fan, cracking the door opposite the fan to ½ in., and running for 5 min.; and (9) keeping the doors open with fan running, introducing a halide detector, and then unloading, 10 min. Total time: 240-255 min.

Although the exhaust blower is kept running during unloading, its aeration is not as complete as desired when operating under this new cycle. Hence, a second vacuum is drawn, and the 60-hp. water-cooled vacuum pump is used to clear the fumigant more thoroughly and in considerably less time.

Three fumigating cycles are run each 24 hr. In this scheduling, one of the cycles is an overnight job.

Improvements Made in Chambers

Minor changes, which proved to be improvements, were made in the original design of the chambers. A welded chamber-length guard was installed over the low-level gas inlet pipes to protect them from bumps by loaded trailers. This guard made it unnecessary to use the former floor-guide rails for the trailer wheels. These rails had put a limitation on the height to which box-pallets could be loaded by forklift truck.

Also modified are the doors, each of which is suspended from a separate roller-bearing jib crane that swings the door in and out of position. Rungs were spot-welded to these doors to facilitate opening and closing. And now the awkward rod-handle fasteners are due to be replaced by spinner-type wheels. A concrete ramp leads to each chamber door.

For efficient vacuum-chamber operation, there has been a need for standardized pallets, both box and flat type, which will fit the dimensions of the chambers. These are now being sup-

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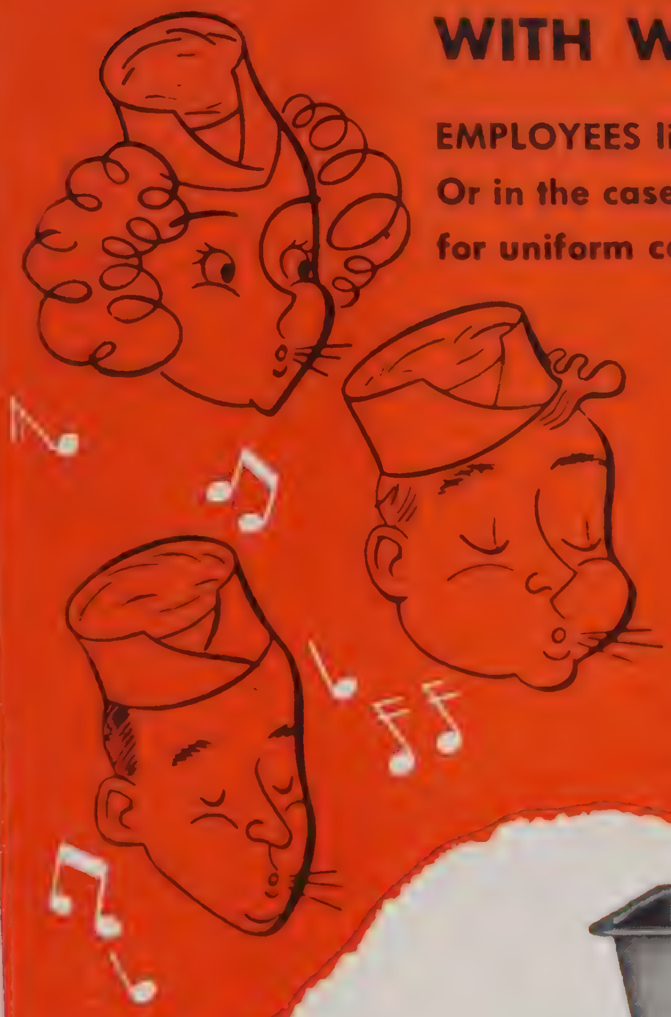

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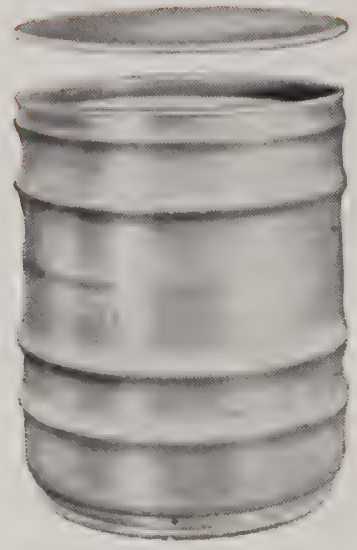

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plied. By employing such pallets, ful use can be made of all the space in the chambers. Furthermore, loading and unloading operations will be simplified and expedited.

Some of the Safety Factors

Finally, in considering the use o the vacuum-chamber method, safety factors must not be overlooked. If the fumigants are improperly handled, they can cause much harm. Methyl bromide, a cumulative poison, is more dangerous than Acrylon. Under certain conditions, methyl bromide ranks with the highly poisonous hydrogen sulphide and hydrocyanic acid, although the immediate effects are much less severe. Even vapors of low concentration of methyl bromide should not be breathed, since immunity is not assured.

The halide detector, used as the standard safety aid in handling methyl bromide, is essentially a Bunsen burner covered on the top with a copper screen. If there is any methyl bromide present in the air, the detector gives off a green flame, beginning with a slight green tinge at about 10 ppm.

Halide detectors are employed where methyl bromide cylinders are hooked up to the volatilizers. They are also used at those points where trailers are first removed from the fumigating chambers.

And there are these additional safety measures: (1) Gas masks are provided; (2) neoprene gloves are used for handling gas cylinders; (3) fumigants are stored in dry, well-ventilated enclosures; and (4) vacuum-fumigation chambers are operated only by trained personnel.

—End—

Corn Maturity Tests

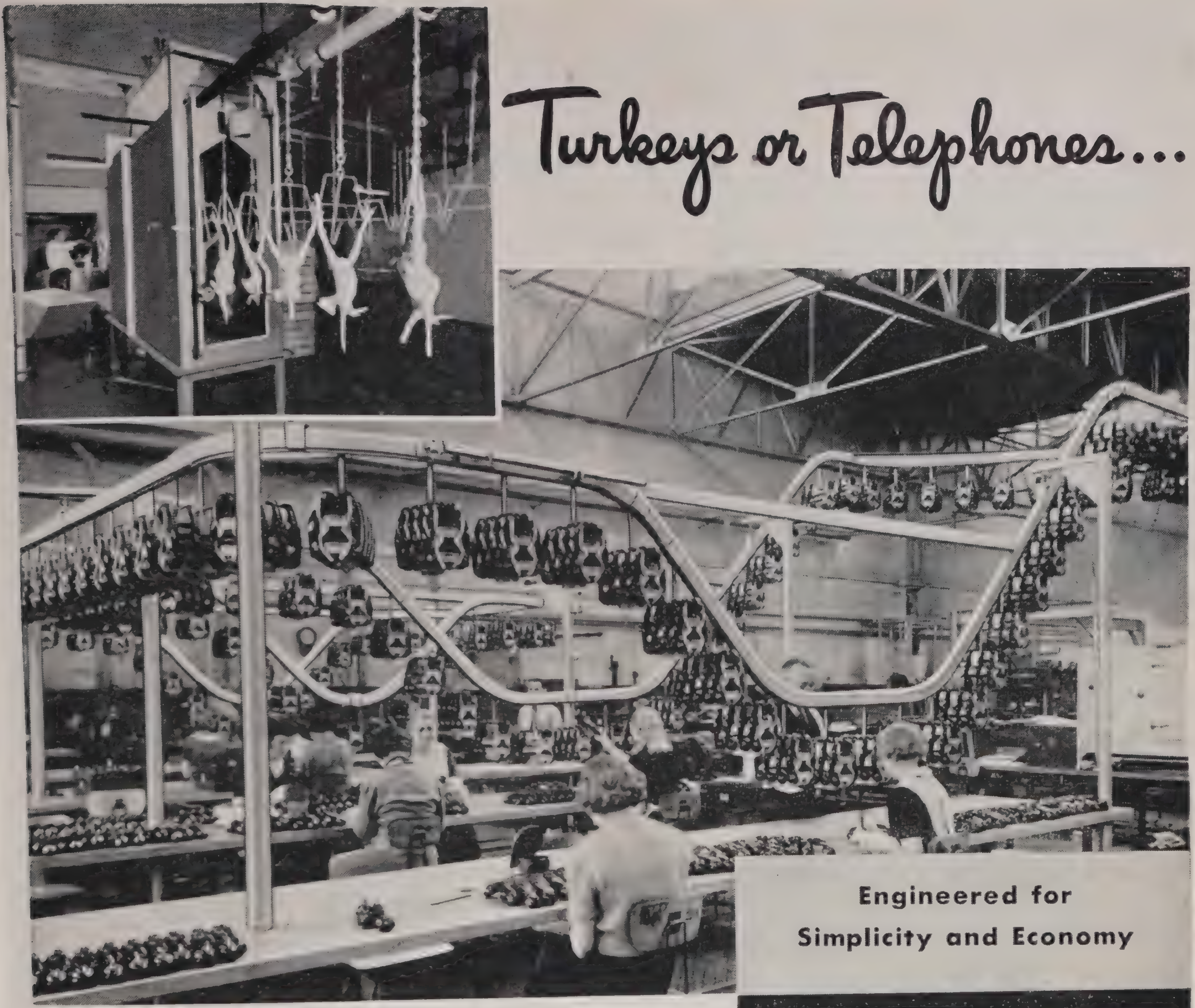
—Continued from page 65

Zero time is that point immediately following the closing of the prisms and adjusting the light. Determinations were made on other samples, and the results were similar in all cases. The refractometer reading decreases abruptly in the first two minutes after the sample is placed in the prisms.

It has been shown that in the presence of a high level of glucose-l-phosphate, inorganic phosphate, and the enzyme phosphorylase, formation of starch occurs. The enzyme is found in a number of higher plants, and the reaction best occurs at pH 5 to 7 (the pH of corn is 5.7 to 6.5).

This brings up a problem: Whether to take the readings as soon as possible, or to wait until the readings

Turkeys or Telephones...



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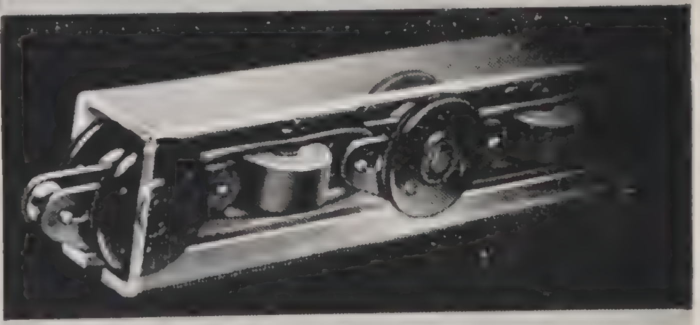

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level off. Although taking the reading immediately is probably a more accurate method of deriving the actual percent moisture, it is probably better to wait until the readings become constant and thereby obtain a more reproducible figure. The use of a waiting period enables greater uniformity in readings with different operators. A waiting period of at least one minute should be used to insure uniformity.

Overnight Storage

8. **Holdovers:** These are loads of corn delivered late in the work day and thus held over on the platform for the following day's processing. The corn is spread to a depth of 18 in. to allow partial aerobic conditions and to minimize heating due to respiration resulting from the over-night storage.

It was found that holdover corn always lost some moisture, the degree of this loss being dependent upon the actual time of holding and the atmospheric condition. In most cases, the moisture lost amounted to a decrease of 1 to 2 percent.

The probable quality of holdover corn following storage could be predicted by the regular refractometer test made when the corn was delivered.

In all cases, it was necessary that a fresh sample be taken in the morning and tested to safely determine the load's fitness for processing. Generally, it was found that hold-overs would rate one grade lower—e.g., a corn designated as suitable for "Fancy" would place in "Extra Standard" the morning following the test.

Factors Affecting Results

1. **Mechanical shock:** The prism holders of the instrument are mounted on a collar which is fastened to the central shaft by a very small diameter set-screw. Because of this construction, the calibration may easily be thrown off by the slightest jar or bump. There is considerable movement about the instrument during its operation, and it thus may be mechanically disturbed.

Should the operator, at any time, bump the instrument, operations must cease while the instrument is carefully cleaned with sodium hexametaphosphate solution, flushed with distilled water, and checked against zero-reading on distilled water. The degree of error should be recorded on the calibration card, which should be kept adjacent to the instrument. It will not be necessary to recalibrate the instrument immediately if the correction is noted and applied to all subsequent readings.

2. **Variations among operators:** In

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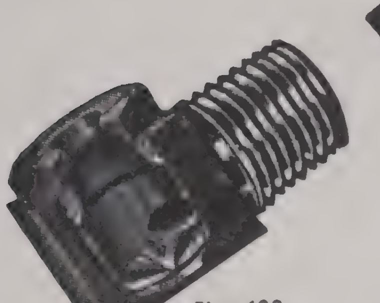

Fig. 629

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order to determine uniformity of results when the refractometer instrument was used by different operators, five samples of corn were prepared and the juice measured independently by four different operators. The average deviation for the first four determinations was four minutes, this being equivalent to 0.25 percent moisture.

3. **Turbidity of juice:** There is no difficulty in obtaining reproducible results on corn that tests 74 percent moisture or greater. Little difficulty is encountered with moistures from 73 to 71 percent, but with corn that tests less than 70 percent the juice is extremely turbid with starch and the readings are difficult to make. When the moisture is as low as 67 percent, or less, the instrument is useless. In the packing of whole kernel corn, the moisture of the corn should never be less than 71 percent, thus turbidity need cause no trouble.

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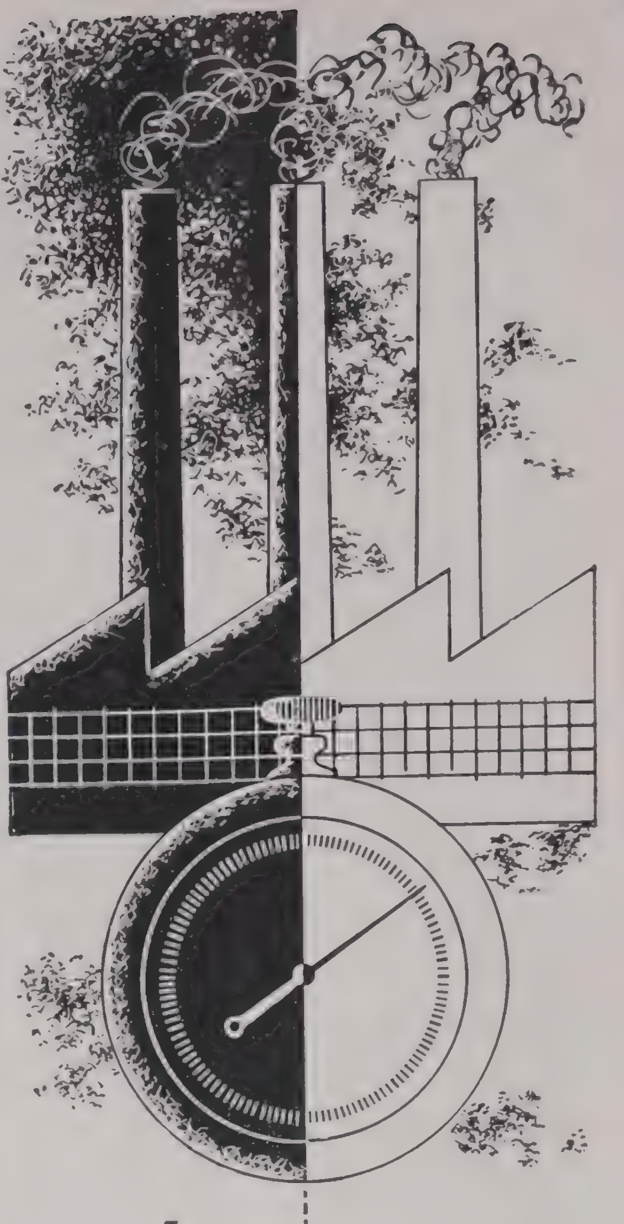
Acknowledgement

The authors are indebted to R. H. Winters, of the Larsen Co., Green Bay, Wis., under whose authorization facilities were made available for this study.

—End



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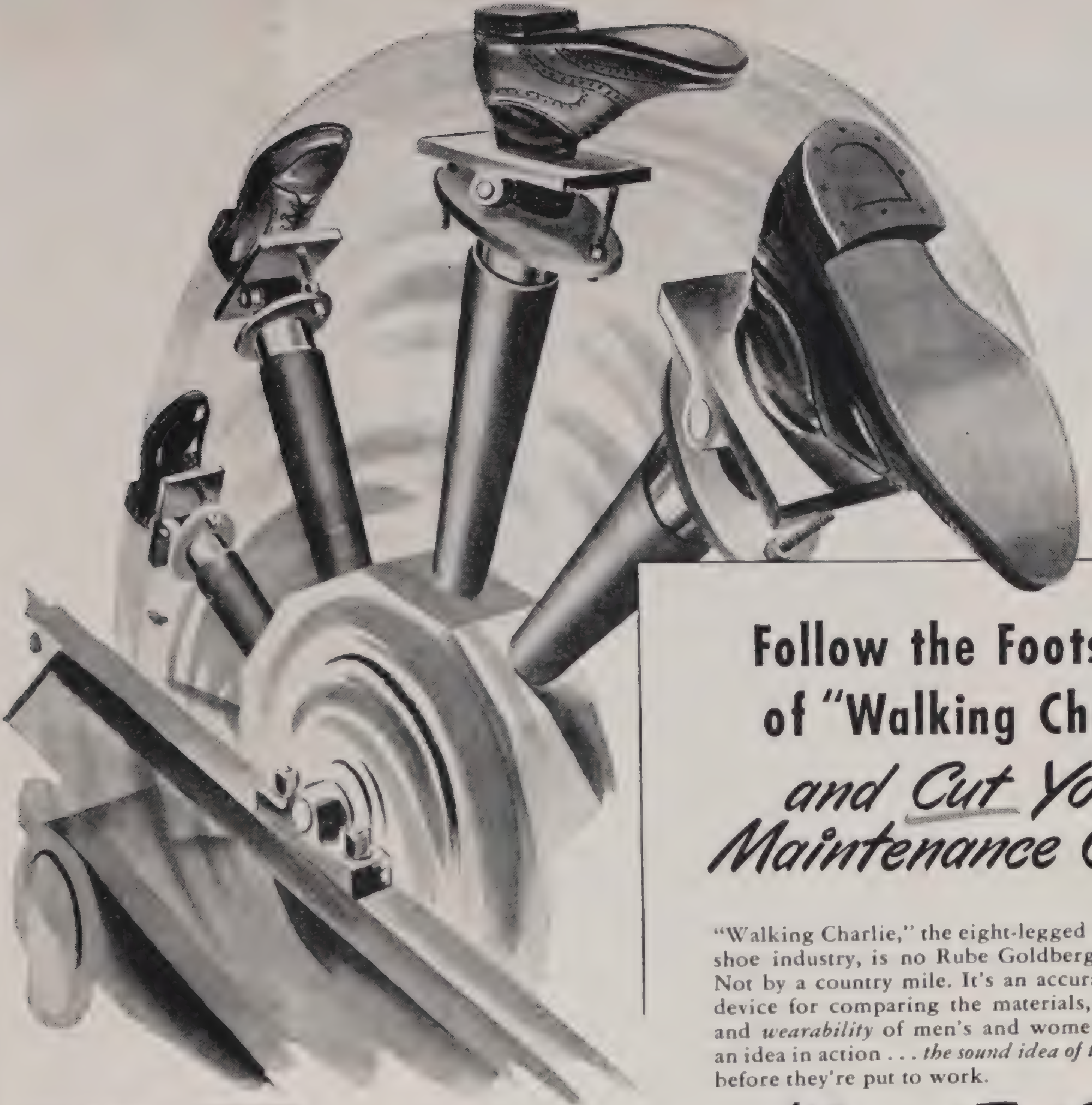

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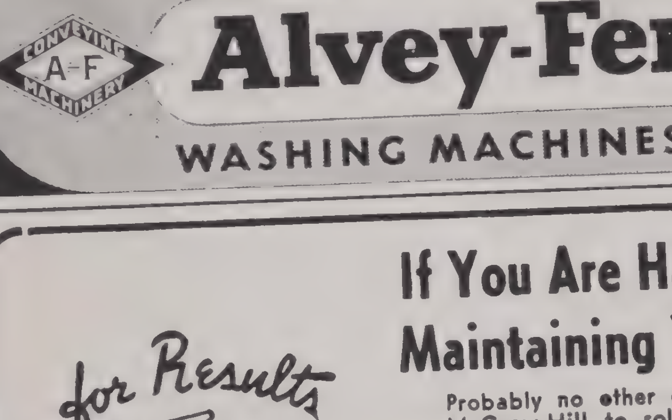

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Nitrogen Protects Foods

—Continued from page 38

retention. Storage-stability tests on packs of juice prepared under various atmosphere conditions are still in progress. To date, results favor the use of nitrogen.

Nuts Now Nitrogen-Packed

Peanuts, pecans, walnuts, and Brazil nuts contain up to 50 percent of oil by weight. When these nuts are stored in the presence of air, their oils may turn rancid. Tests showed that nitrogen-packing is quite effective for preventing off-flavors caused by rancidity.

Tests have been conducted on processing and packaging peanut butter in an atmosphere of nitrogen. Results indicate an improved product.

There are several food applications under study and discussion that may be further investigated in Linde laboratories. These applications concern possible nitrogen-processing, with or without packing, of fresh milk, butter, coffee and wine.

How Oils Are Protected

Edible vegetable oils, in their extracted state, are generally in contact with air. They tend, therefore, to form peroxides and rancid products which must be removed. This is done at the refinery by a steam-vacuum combination called "deodorization."

After this procedure, the oils pass through coolers and closed filters to storage tanks, or directly into tank cars for shipment to food processors. Oil passes, as needed, from the storage tanks into tank cars.

Nitrogen, if mixed in proper quantities with hot edible oils immediately after deodorization, excludes oxygen from the oils. If the oils are free of peroxides, nitrogen may be used to saturate and blanket the oils to prevent rancidity. Additional nitrogen purges the head-space atmosphere in storage tanks and tank cars after each is filled.

Some food processors receive nitrogen-protected oils from refineries. These processors continue nitrogen protection in their own operations. Some margarine and shortening makers use nitrogen in their Votators for plasticizing. This nitrogen saturates the entire mass being processed and prolongs the keeping qualities of the resultant products.

Tank Car Angle

Since refineries often sell edible oils according to peroxide number specifications, the failure of an edible-oil shipment to be less than a speci

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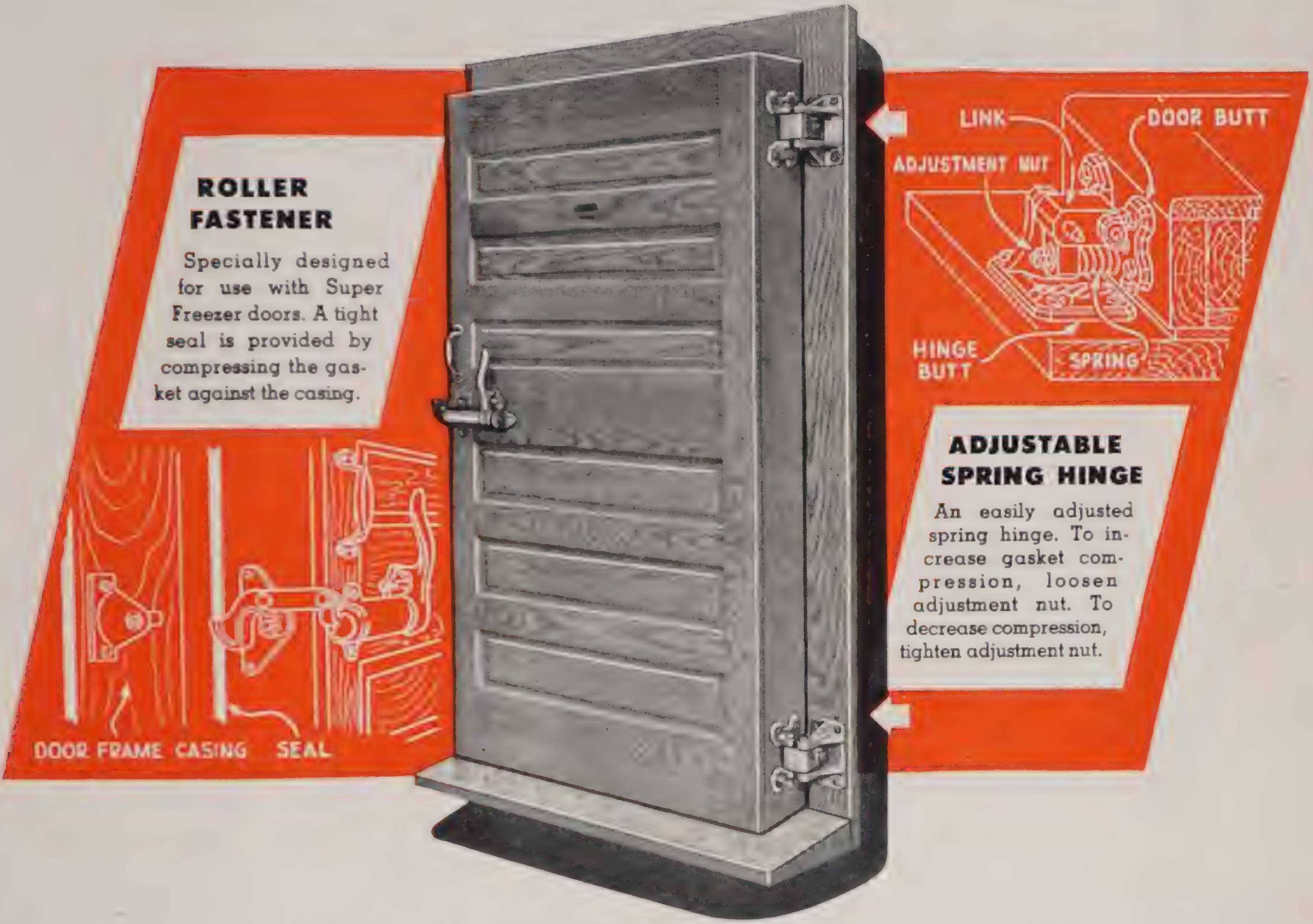
This Super Freezer Cold Storage Door is of the Stevenson overlap type for service at sub-freezing and sharp freezing temperatures. It is far superior for ice cream hardening rooms, frozen food storage, low-temperature test rooms, and similar applications. Hardware of extraordinary strength and unusual design is used on these doors.



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Specially designed for use with Super Freezer doors. A tight seal is provided by compressing the gasket against the casing.

ADJUSTABLE SPRING HINGE

An easily adjusted spring hinge. To increase gasket compression, loosen adjustment nut. To decrease compression, tighten adjustment nut.

Standard models of this Jamison-built Super Freezer Door are available in a wide range of sizes. Should you require special types or sizes, we are equipped to build them to any specification. Write for the address of our nearest branch office or send for complete catalog to Jamison Cold Storage Door Co., Hagerstown, Maryland.

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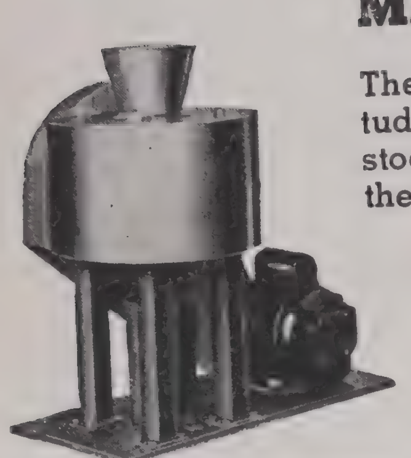
CRCO QUARTERING MACHINE FOR PICKLES

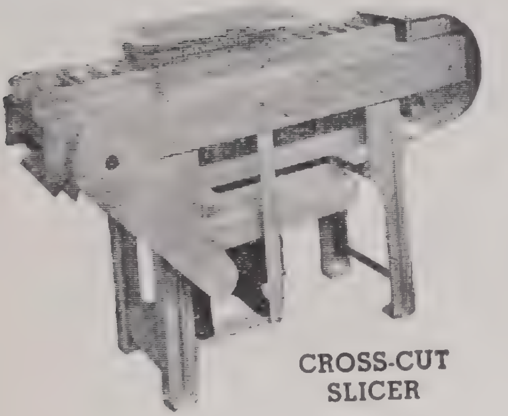
The new CRCO Quartering Machine for longitudinal quartering of pickles, cucumbers, brine stock, beets, etc., up to 3" diameter will perform the work of upward to 20 women producing the same type of cut by hand. The product to be quartered is fed into the hopper where it is drawn through four equally-spaced knives revolving at 350 r.p.m. The discharge is through a tubular chute into receptacle or onto conveyor. The product can be handled just as fast as it can be fed into the machine.



QUARTERING MACHINE

CROSS-CUT SLICER

The CRCO Cross-Cut Slicer delivers uniform slices with clean-cut edges and is used on cucumbers, beets, mushrooms, celery, okra, etc. Slices are 5/16", 7/32", 9/32" or ⅜" or in any multiple of the above by removing alternate knives when larger pieces are desired. A compact, motor-driven unit requiring but little floor space.



CROSS-CUT SLICER

RELISH CUTTER

The CRCO Relish Cutter for cucumbers, onions, peppers, tomatoes, beets, carrots, cabbage or other products always produces clean-cut pieces of uniform size. No variation, no matter how long the run. Size can be changed by adjusting the knives and grates.

RELISH CUTTER

Send for complete details, specifications and prices.

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fied peroxide value on delivery means rejection of the tank car.

The use of nitrogen immediately after deodorization and up to the moment of delivery can prevent rejections.

Salad Oil Simplification

Concerning this matter of edible oils, at least one concern is putting nitrogen-treated salad oil into bottles and protecting the head-space with nitrogen. And as a result, it is no longer necessary to protect the oil from daylight by using colored glass or by employing cartons to cover the bottles.

Other manufacturers who produce vegetable and animal shortenings have begun the practice of fluffing their products with nitrogen, instead of air, as previously. Then they purge and fill the head-space of their tin cans with nitrogen before sealing.

Information in the above article was based on work conducted in laboratories of the Linde Air Products Co. at Tonawanda, N. Y., and Newark, N. J., and the cooperation of processors in various branches of the food industry is respectfully acknowledged by the author.

—End

CASE HISTORY #3

The .... Co., nationally known manufacturers of food products, needed additional package production.
Plant space was at a premium, and, all available personnel were required for current production.
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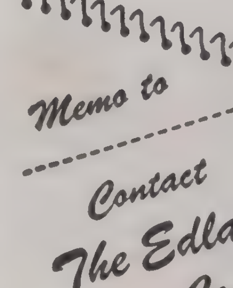


Memo to
Contact
The Edlaw Co.

Contract Packaging
AT PRE-DETERMINED COST

88-61 76th AVENUE
GLENDALE, L. I., N. Y.

CELLOPHANE SPELLS BETTER FOOD PACKAGING

moisture protection
transparency
sales appeal **100%**
grease protection
strength

Whatever your specialty there is a Sylvania Cellophane that offers just the combination of properties you need for successful packaging.

Because they are truly transparent, they give you the extra visibility that means sales appeal. They resist grease . . . keep your product free from contamination. Their uniform strength and heat sealing qualities make them easy to apply either by hand or automatic equipment.

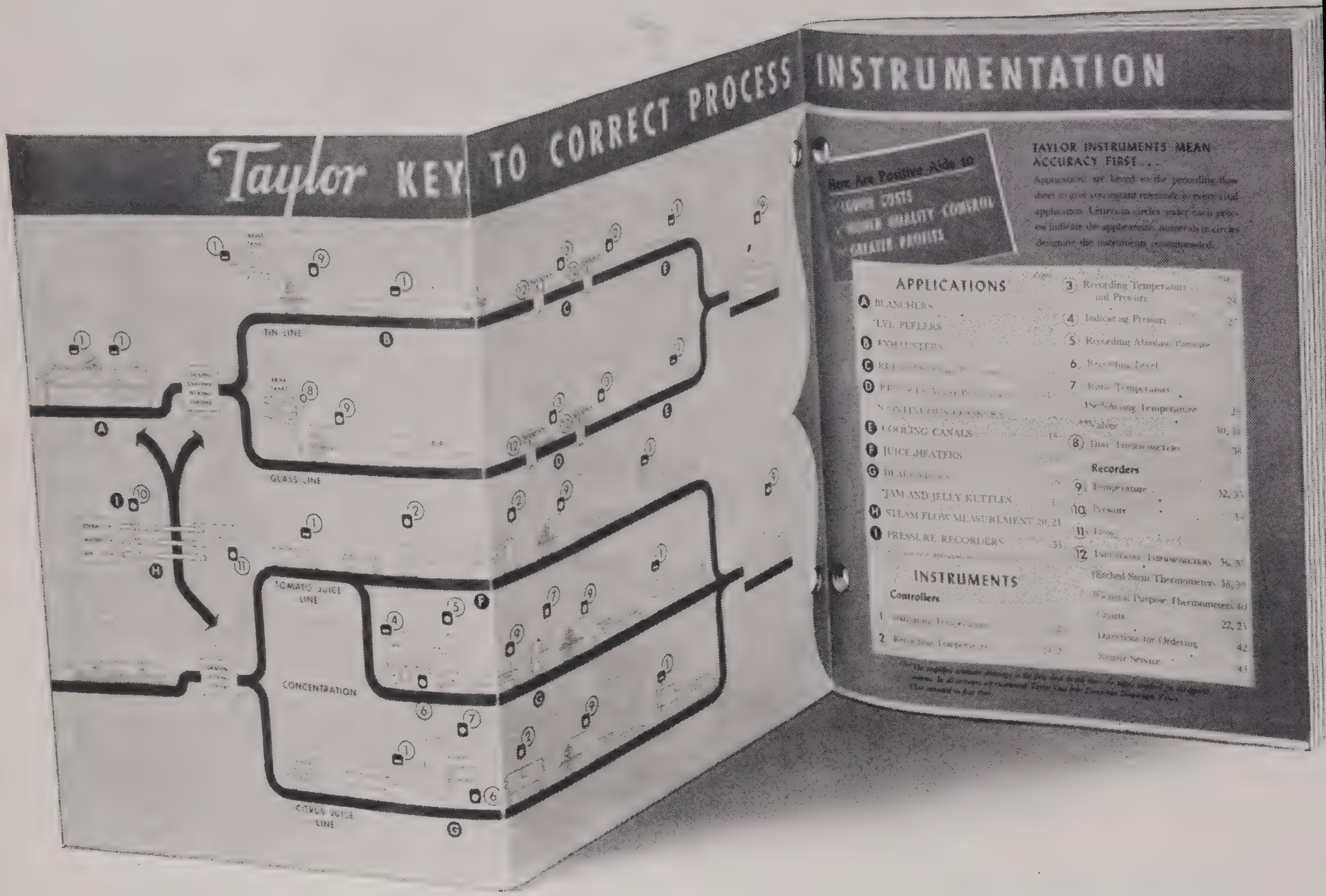
Talk over your packaging problems with the Sylvania representative. He'll be glad to help you determine the combination of properties needed for your products. Or write to Market Development, Dept. F-9, for information, mentioning the specific application in which you are interested. You'll find us most cooperative.

Attractively printed Sylvania Cellophane Type MS bag provides a mouth watering display for potato chips . . . puts your brand name where it will be remembered . . . builds repeat sales.

SYLVANIA CELLOPHANE

SYLVANIA DIVISION AMERICAN VISCOSE CORPORATION
Manufacturers of cellophane and other cellulose products since 1929
General Sales Office: 350 Fifth Avenue, New York 1, N. Y.
Plant: Fredericksburg, Va.

THIS FLOW SHEET


Taylor KEY TO CORRECT PROCESS INSTRUMENTATION
TIN LINE
GLASS LINE
TOMATO JUICE LINE
CONCENTRATION
CITRUS JUICE LINE
Here Are Positive Aids to
LOWER COSTS
HIGHER QUALITY CONTROL
GREATER PROFITS
TAYLOR INSTRUMENTS MEAN ACCURACY FIRST . . .
APPLICATIONS
BLANCHERS
LYE PEELERS
COOLING CANALS
JUICE HEATERS
JAM AND JELLY KETTLES
STEAM FLOW MEASUREMENT 20, 21
PRESSURE RECORDERS
INSTRUMENTS
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Recording Temperature and Pressure
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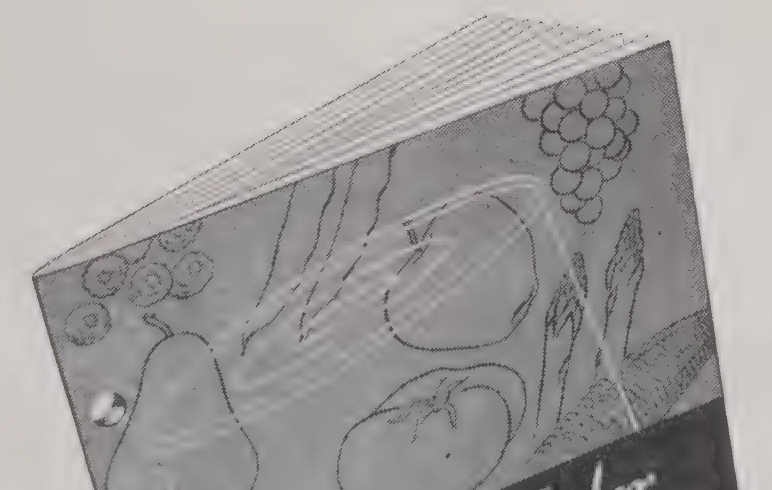

Taylor
INSTRUMENTS FOR THE CANNING INDUSTRY

SEND FOR CATALOG 500

45 pages including Flow Sheet illustrated above. Many photographs, drawings, and detailed specifications covering the latest instrumentation for almost every type of canning process including tin, glass, evaporation, citrus juices. Write for your free copy now!

shows just where instrumentation can save you money!

WORRIED ABOUT PROFITS? Trying to figure out how you can boost quality and cut costs at the same time? This Taylor Flow Sheet shows the key points where Instrumentation can help you get the jump on competition. Together with the new Taylor Catalog of which it is a part, it shows over twenty Taylor Process Control Systems now being successfully used by leading canners, plus dozens of other instruments, applications and ideas for quality-and-cost control.

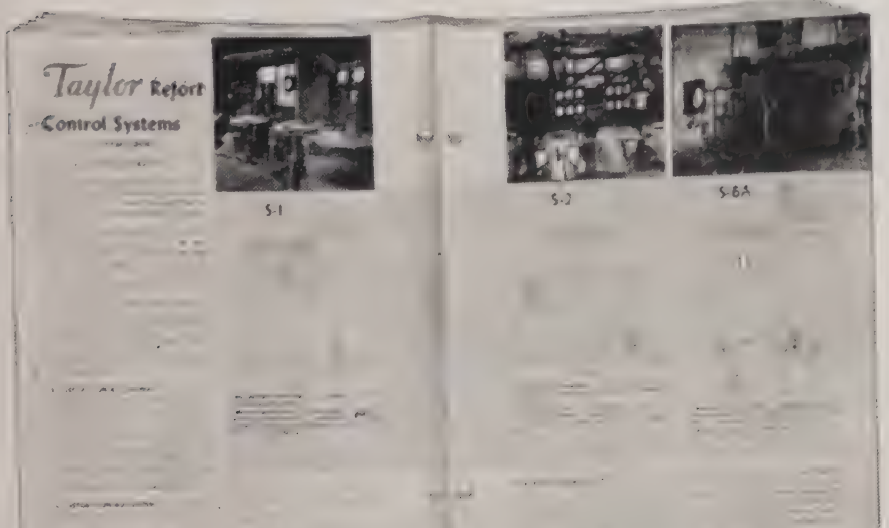
YEARS OF EXPERIENCE BEHIND IT

As simple as this flow sheet looks, it's the result of many years of experience and thousands of man-hours of working with the food industry to develop closer, more accurate control over every type of food processing.

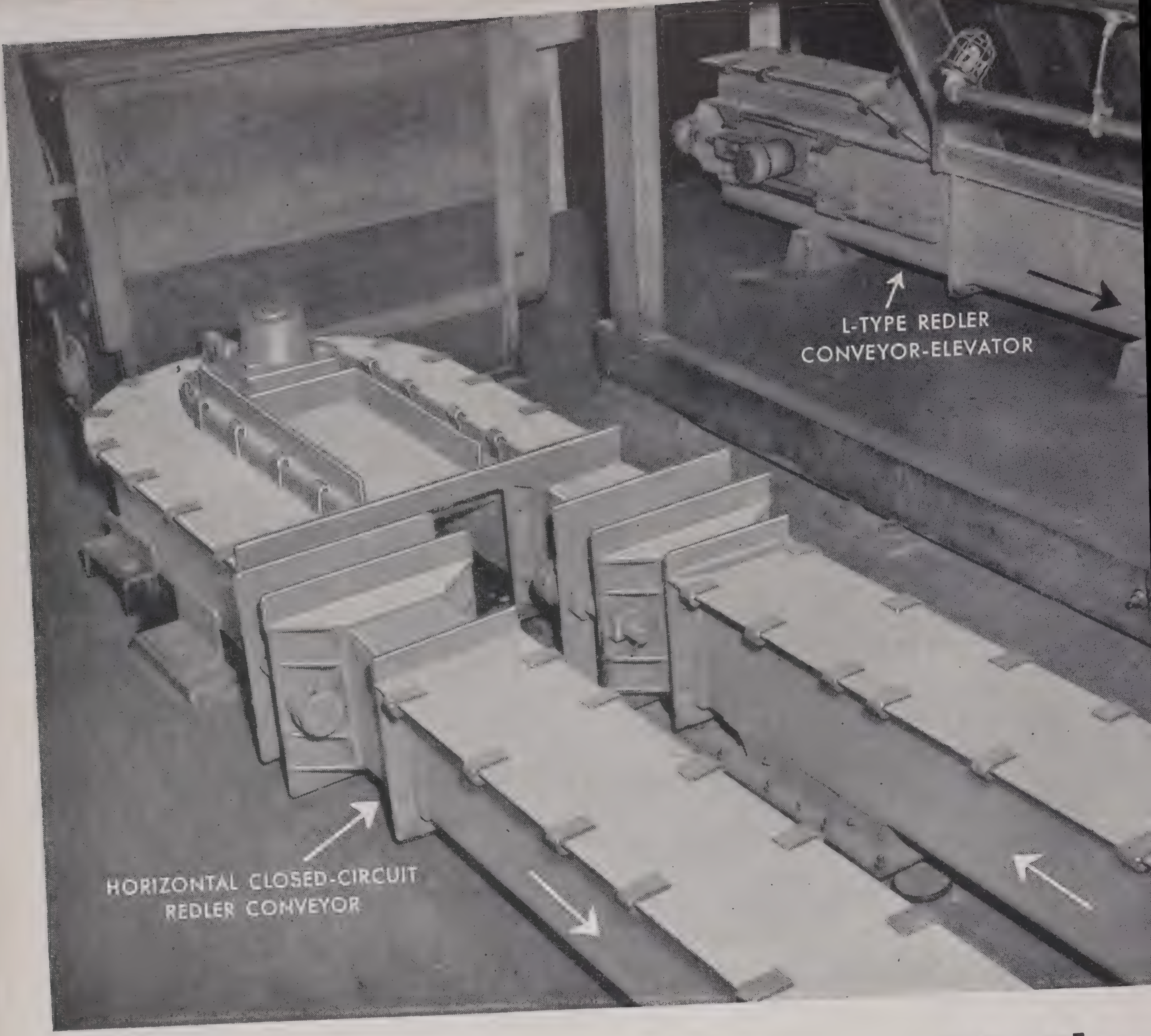
TESTED CONTROLS FOR EVERY PROCESS

Whether you're processing in tin or glass, canning beans or orange juice, there's a tested Taylor System that can probably improve the efficiency of your operation. We want to work with you, and we'd like to start by sending you this free catalog. Why not ask your Taylor Field Engineer? Or write today! Taylor Instrument Companies. Rochester, N. Y., or Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.



Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY



WORKING WONDERS . . . with Flou

Handling flour from storage, through sifting to mixing machine with freedom from spillage and contamination is the "Wonder" job this REDLER Conveyor System does for the makers of Wonder Bread and Hostess Cakes. Compactly designed for close quarters, enclosed REDLER casings are still accessible for inspection and maintenance.

Such a system as this is just one of the thousands of bulk materials handling systems S-A engineers have designed to meet specific requirements. For nearly 50 years Stephens-Adamson has been designing and installing bulk materials handling systems that always do the job of handling the most material at the lowest cost per ton.

So take advantage of their years of experience and put it to work on your problem. Whether you plan a new unit or an entirely new system . . . *first* get the recommendations of S-A engineers. Write today.

CONTINENTAL BAKING CO.
MINNEAPOLIS, MINN.

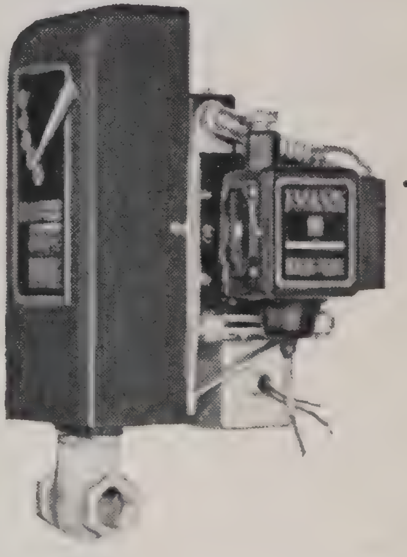
An L-shaped REDLER Conveyor-Elev
moves flour from under main storage
and elevates it to discharge point over s
machine. Horizontal closed-circuit R
LER Conveyor receives flour from s
and discharges it via 3 spouts into hop
located over mixing machines on floo
low. If hoppers are full, closed-ci
REDLER simply re-circulates flour un
hopper is empty enough to take more.
REDLER System is designed to ho
3½ tons of flour per hour.

STEPHENS-ADAMSON MFG. CO.

6 Ridgeway Avenue, Aurora, Illinois
Los Angeles, Calif. • Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPM

Pick the *Temperature Control* That Suits *Your* Need...



Brown Instruments Give You a Choice!

Just how much precision you need in your temperature control determines the type of instrument you should have. Brown gives you a selection . . . you pick the one that suits your need!

For critical applications. Brown *ElectroniK* Potentiometers . . . strip-chart, circular-chart, circular-scale . . . for utmost precision. Outstanding features include: Accuracy to ±1/10°; On-the-job range changeability; Multiple-point recording; Full scale travel as fast as two seconds; Operating position flexibility; Large pointer and scale; Minimum maintenance.

For general applications. Brown Thermometers . . . indicating, recording, controlling—electric or air-operated systems . . . for processing operations which do not require utmost precision. Available with a wide range of bulb styles, connections and fittings.

For every-day applications. Honeywell Self-Contained Regulator . . . combination temperature controller and motorized valve . . . for small, inconspicuous operations on which you can save money by incorporating low-cost, automatic control.

Call in your local Brown engineer, today . . . for a discussion of your temperature control needs.

BROWN INSTRUMENTS
WORLD'S LARGEST ORGANIZATION FOR ADVANCED INSTRUMENTATION AND CONTROL
BELFIELD VALVES

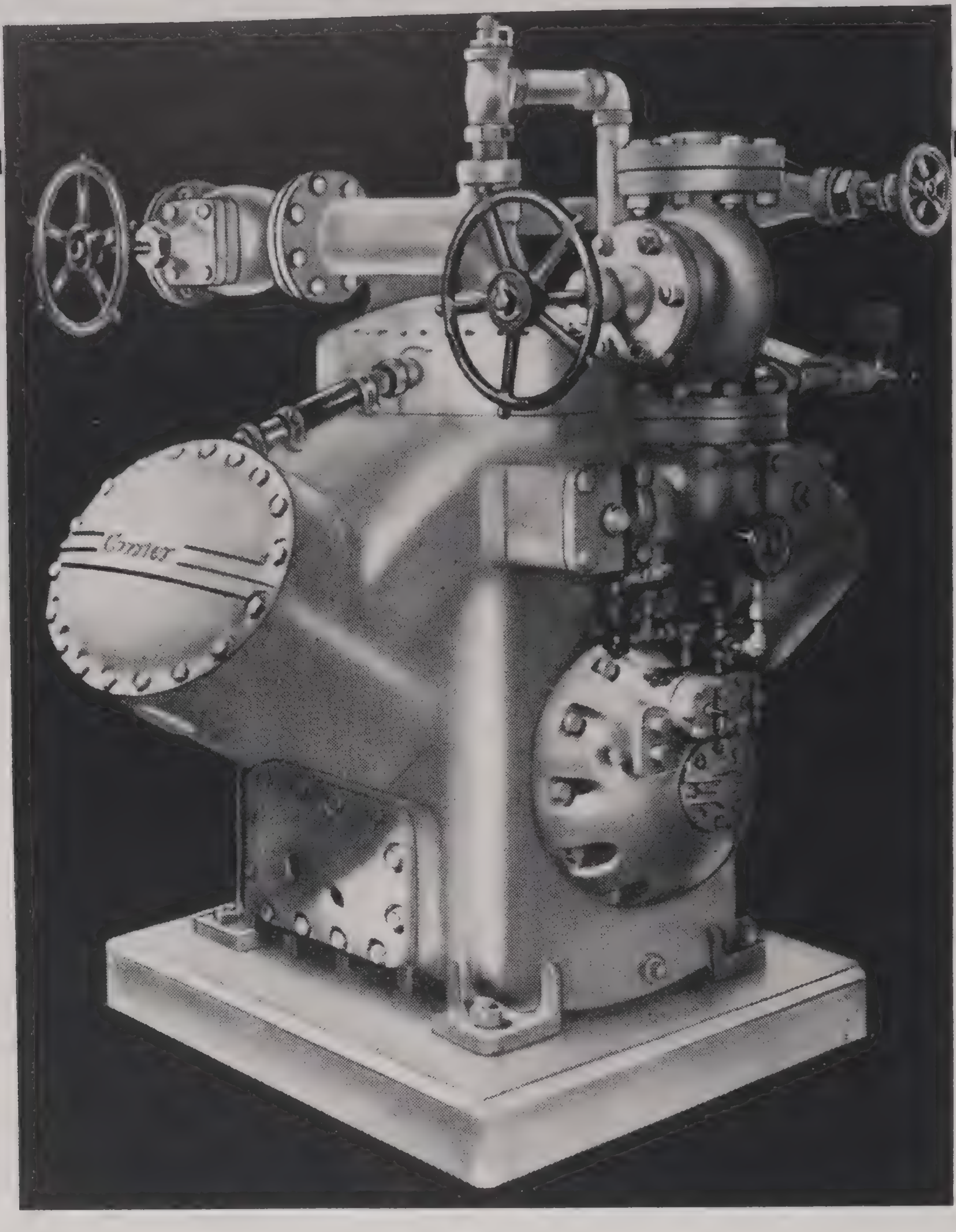
MINNEAPOLIS-HONEYWELL REGULATOR CO.
BROWN INSTRUMENTS DIVISION
4502 Wayne Ave., Philadelphia 44, Pa.
Offices in 73 principal cities of the United States, Canada and throughout the world

MINNEAPOLIS **Honeywell**

Advanced Instrumentation
FOR THE FOOD INDUSTRY

BROWN INSTRUMENTS

THE LATEST DESIGN IN LARGE RECIPROCATING COMPRESSORS!



FROM CARRIER — the firm that was first with the Centrifugal Refrigeration machine, first with large, safe, absorption-type refrigeration machines, first with Cold Diffusers and Evaporative Condensers, first with scores of refrigeration advancements — comes this new Reciprocating Compressor with new features, new performance, new compactness. It was developed by Carrier engineers from years of practical experience to best answer the needs of commercial applications requiring from 50 to 200 horsepower in single units.

Cold storage, food freezing, breweries, packing houses, air conditioning, and many other applications that demand reliable refrigeration, will find this new Carrier Compressor setting new standards of efficient, economical performance.

Minimum weight and vibration — under most conditions the compressor can be located on upper floors.

Direct or belt driven — can be powered by motor, gas or Diesel engine, or steam turbine with gear. May be operated as dual units from a single motor with a double shaft.

High partial load efficiency — latest design in cylinder unloading also provides unloaded starting so that normal torque motors may be used.

Uses most refrigerants — can be operated with ammonia, "Freon-12," "Freon-22" and many others.

Extra mechanical features — water-jacketed cylinder heads . . . forced feed lubrication . . . built-in safety controls . . . vapor cushioned valves . . . external oil cooler . . . efficient centrifugal-type oil separator.

For complete information about the new, large Carrier Compressor, call your Carrier representative, or write Carrier Corporation, Syracuse, N. Y.

Carrier

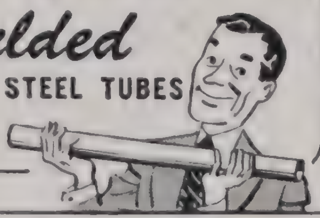
AIR CONDITIONING • REFRIGERATION • INDUSTRIAL HEAT

GLOBE

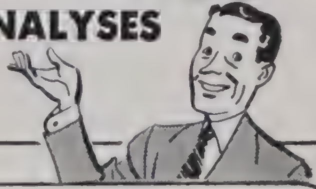
Offers You a Wide Choice in Stainless Steel Tubes

GLOBE
Seamless
STAINLESS STEEL TUBES

GLOWELD
Welded
STAINLESS STEEL TUBES



AVAILABLE IN MORE THAN 26 ANALYSES



For Your Product or Process . . . One of These Types May Offer You the Most In . . .

- **Resistance to Corrosion**
- **Strength at High Temperatures**
- **Resistance to Oxidation at High Temperatures**
- **Ease of Fabrication**

TYPICAL ANALYSES (In Per Cents)

Type No.	Chromium	Nickel	Carbon	Other Elements
301	16-18	6-8	Over .08-.20	
302	17-19	8-10	Over .08-.20	
302B	17-19	8-10	Over .08-.20	Si 2-3
304	18-20	8-11	.08 max.	
308	19-21	10-12	.08 max.	
309	22-24	12-15	.20 max.	
309S	22-26	12-15	.08 max.	
309Cb	22-24	12-15	.10 max.	Cb 8xC min.
310	24-26	19-22	.25 max.	
314	23-26	19-22	.25 max.	Si 1.5-3
316	16-18	11-14	.08 max.	Mo 2-3
316Cb	16-18	10-14	.08 max.	Mo 2-3; Cb 8xC min.
317	18-20	11-14	.08 max.	Mo 3-4
321	17-20	9-13	.08 max.	Ti 5xC min.
329	23-28	2.5-5	.20 max.	Mo 1-2
330	14-16	33-36	.15 max.	
347	17-20	9-13	.08 max.	Cb 10 x C min.
403	11.5-13		.15 max.	
405	11.5-13.5		.08 max.	Al .10-.30
410	11.5-13.5		.15 max.	
416	12-14		.15 max.	P, S, Se min. .07 Zr, Mo max. .60
430	14-18		.12 max.	
443	18-23		.20 max.	Cu .90-1.25
446	23-30		.20 max.	N_2 .10-.25
Inconel*	11-15	70 min.		Fe 10 max.
Nichrome**	20	80		

**Registered U. S. Trade-Mark.* ***Trade-Mark Reg. U. S. Pat. Off.-D-H Co.*

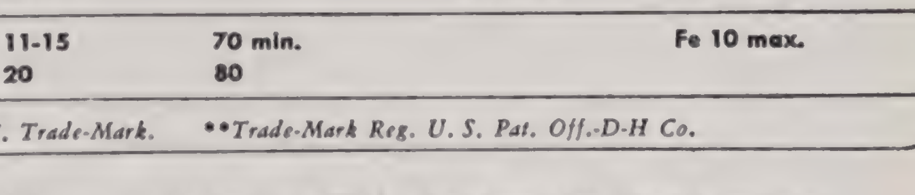
CHROMIUM, nickel, carbon, manganese, silicon, molybdenum, columbium, titanium — these and other elements, combined in various percentages, are the ingredients of stainless steel. Because varying analyses have widely varying service characteristics, Globe recommends a specific analysis or type only after carefully studying your particular problem. In addition to the above 26 standard types, *Globe also furnishes special analyses.*

You benefit from Globe's years of experience and research on stainless steel tubing problems. You are invited to take advantage of the extensive testing facilities in Globe's chemical, physical, and metallurgical laboratories and its staff of scientists and engineers.

GLOBE STEEL TUBES CO., Milwaukee 4, Wisconsin

STEEL ANALYSES CHART

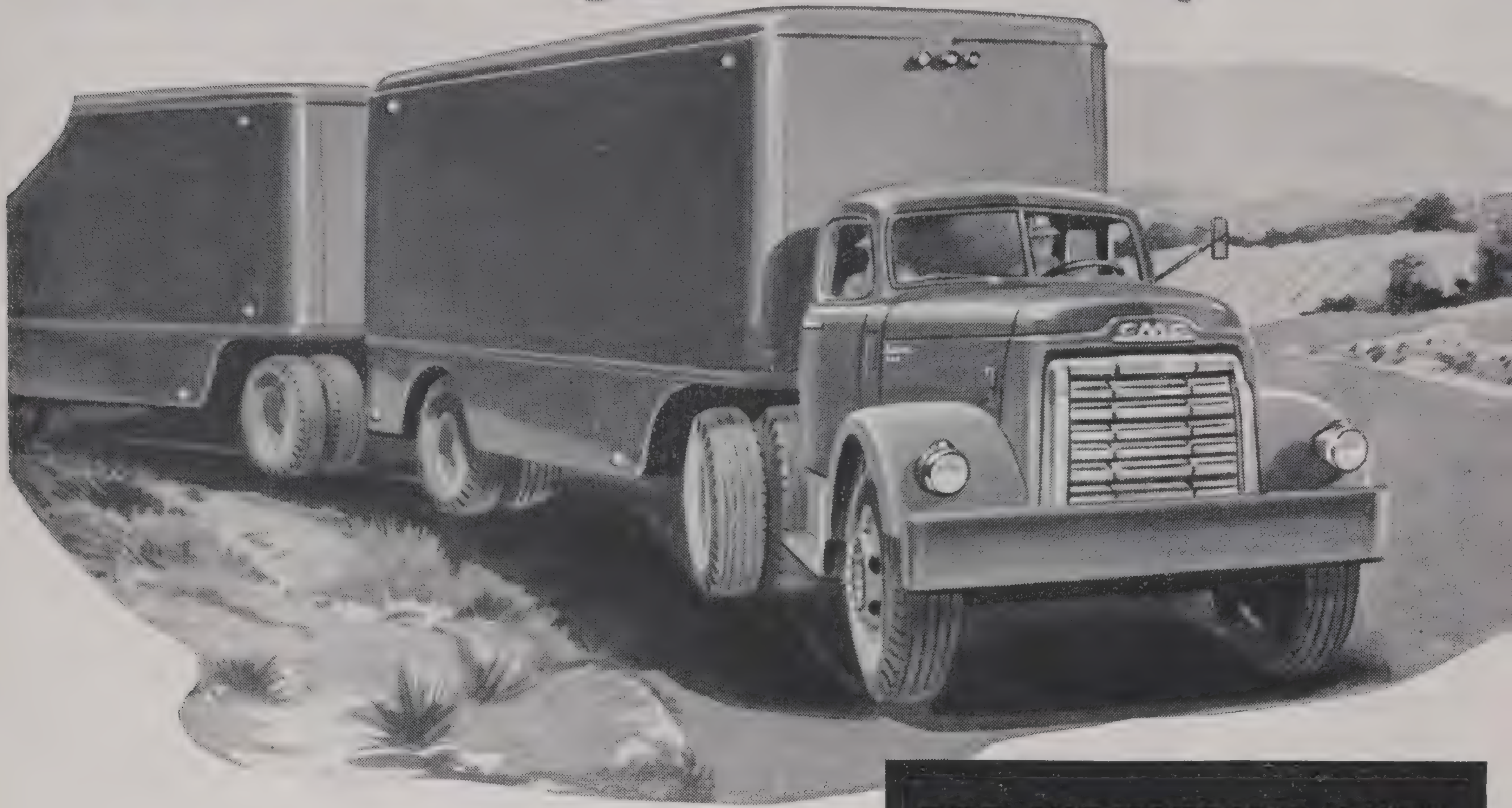
Write for Bulletin 301 — Corrosion and Heat Resisting Steel Analyses Chart — a valuable reference tabulation of stainless steel analyses as produced by various manufacturers.



Seamless Stainless Steel Tubes—Gloweld Welded Stainless Steel Tubes—Carbon-Alloy-Seamless Steel Tubes — Globeiron Seamless High Purity Ingot Iron Tubes — Globe Welding Fittings

All-New and . . .

Just as Rugged as They Look



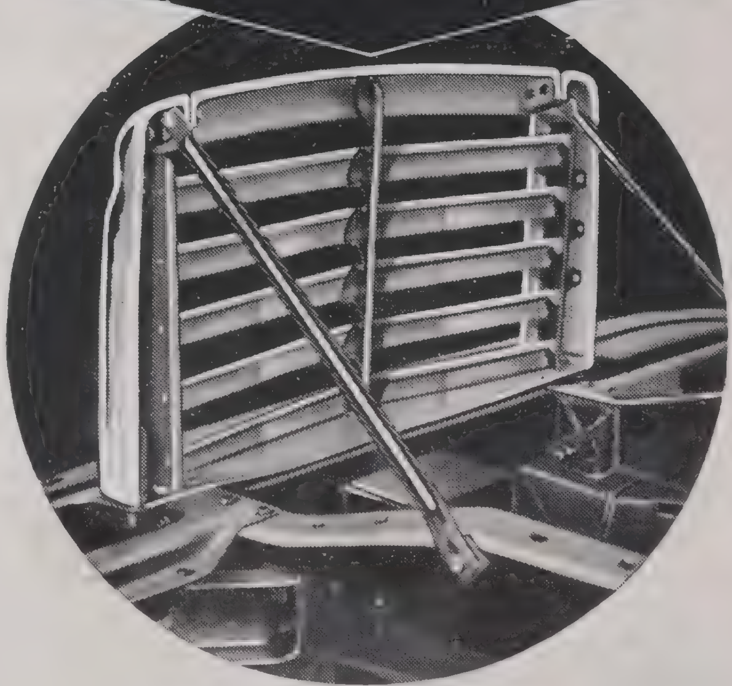
THE INDUSTRY'S ONLY BUMPER-BUILT FRONT END

There's a new look in heavy duty trucks . . . all-new "H" line GMCs. These great new trucks, in weight ratings from 19,000 to more than 90,000 pounds, pace the entire heavy duty field in styling that adds to the prestige of your business. And they pace the field in design and engineering that give you better performance, lower operating costs, longer life.

Four new gasoline engines offer greatly increased power, in addition to traditional GMC extra value . . . famous four- and six-cylinder GM 2-cycle Diesels have higher compression for even greater agility and economy. New, stiffer, straight side rail frames, new wide-track axles, new broad-beam, extra comfort cabs . . . new features by the score all make all-new GMC "H" models best for all heavy city and inter-city transport. Let your nearest GMC headquarters give you complete details.

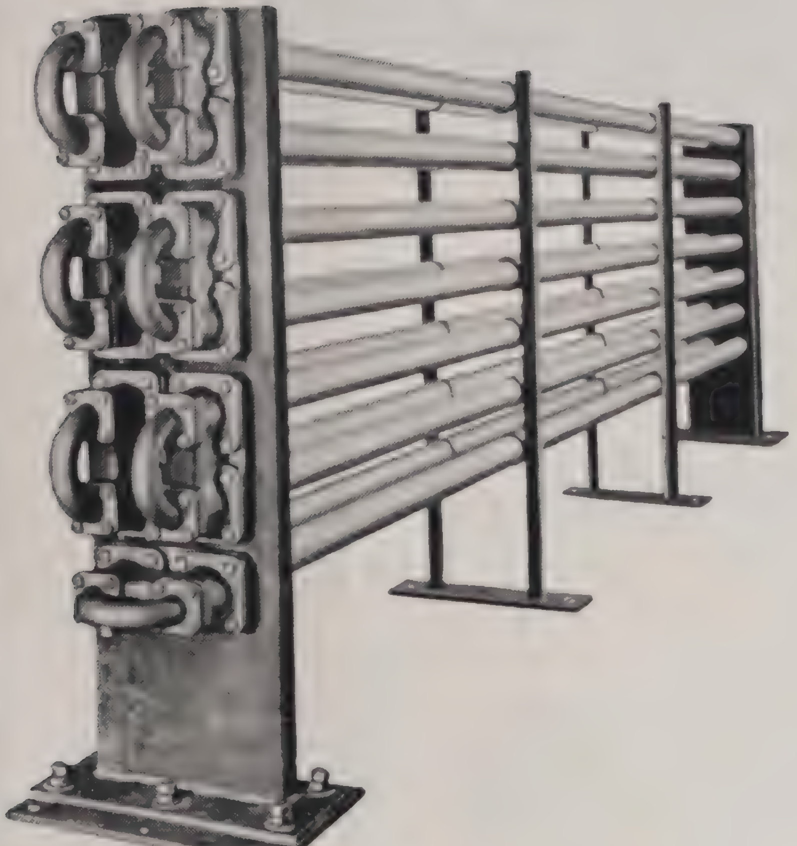
GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

GMC
GASOLINE • DIESEL
TRUCKS



Typical of GMC "H" line ruggedness are angle-braced, frame-mounted radiator grilles with top and sides of spring steel bumper stock, heavy gauge fenders, wide, thick bumpers . . . for complete front end protection, axle to emblem.

How You
SAVE PROCESS TIME
with Carpenter Stainless Tubing



Tube-in-tube heater designed for rapid processing with 1½" O.D. tubing inside of 3¼" O.D. tubing—all Type 316 Carpenter Stainless Tubing. Unit can function as either a heater or cooler and features outstanding flexibility.

Faster heating and cooling can be obtained when you work with the uniform walls of this tubing. There are no heavy sections or "thin spots" in the tube walls. Heat transfer is uniformly good in every length of Carpenter Stainless Tubing.

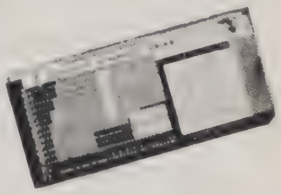
In addition to providing the corrosion resistance you need for long equipment life, Carpenter Stainless Tubing can often be used in lighter gauges at no sacrifice of strength. The wall uniformity of this tubing saves you money. It eliminates the need for ordering heavier gauges than you actually need.

Call your Carpenter Stainless Tubing Distributor for your next order. Large stocks are maintained to meet your needs for rush delivery.

THE CARPENTER STEEL COMPANY
Alloy Tube Division • 109 Springfield Road, Union, N. J.

USEFUL SLIDE CHART OF TUBING DATA

For your copy of the Carpenter Stainless Tubing Slide Chart, send us a note on your company letterhead. The Slide Chart contains easy-to-use data on Physical Properties, Velocity Constants, Mass Velocity Constants, Areas of Tubes, etc. Write today.

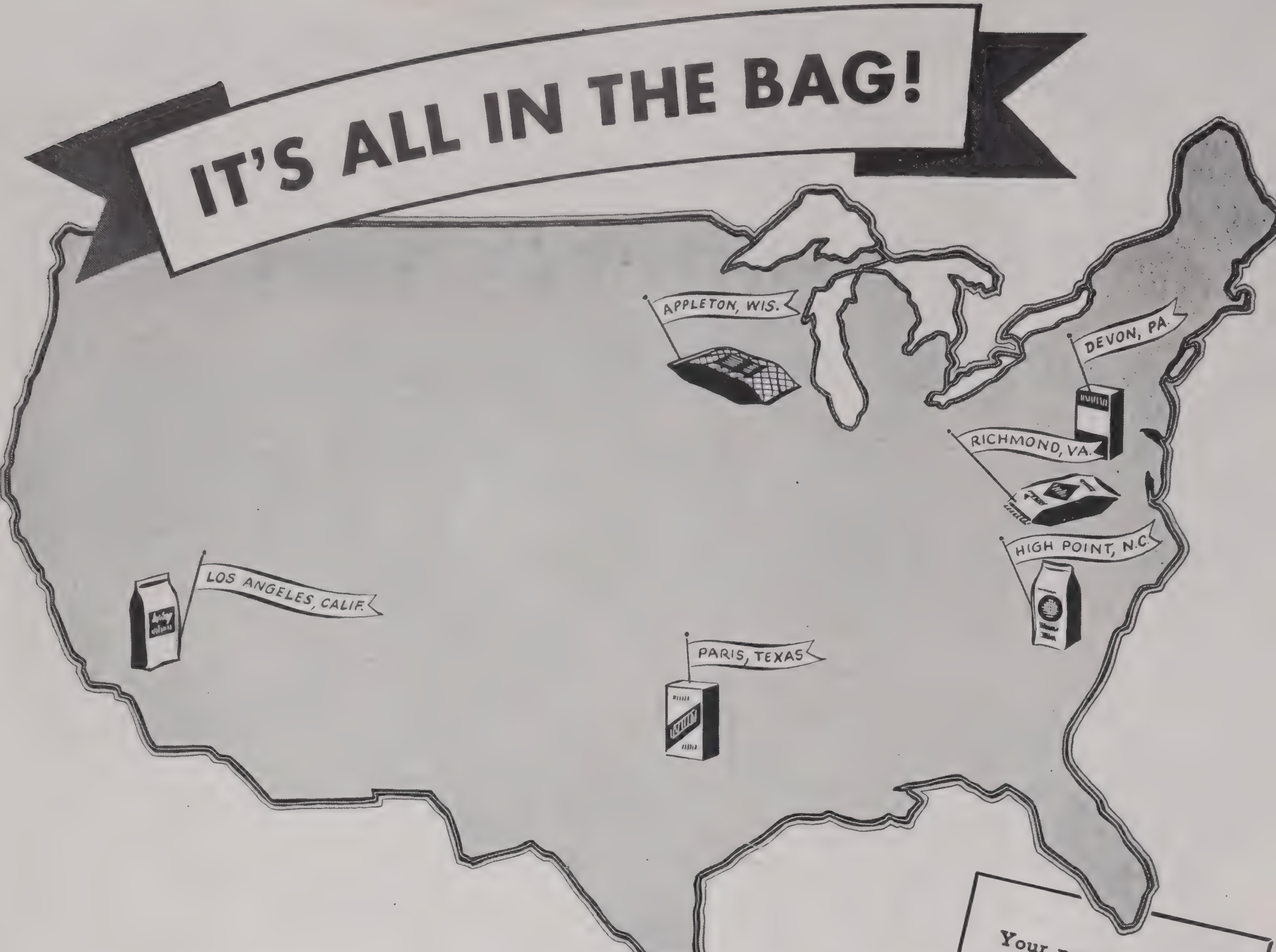


24-Hour Service—You get definite delivery information within 24 hours when you call your Carpenter Stainless Tubing Distributor.

Carpenter

STAINLESS TUBING

"MORE THAN CORROSION RESISTANCE"



From these strategically-located Betner Bag plants comes a complete food packaging service for all the U.S.A.

Pinpointed for service to food processors everywhere . . . that's the big idea behind the locating of these Betner Better Bag plants. Where do you have your business? What kind of bag do you need for your product? Betner has it . . . and can get it to you quickly.

Backing up our idea of what a complete bag service should be is a widely-flung sales organization, one or more members of which are near you. Betner Bags are, in effect, as close to you as your classified directory.

Your product will GO safely in one of these types of bag

Coffee
Flour
Sugar
Potato chip
Prepared mix
Gelatin dessert
Specialties
And Many Others

Betner bags are "proofed" against . . .

moisture-vapor
grease
insects
water
sifting

Many Betner bags are THERMOSEAL*-ed

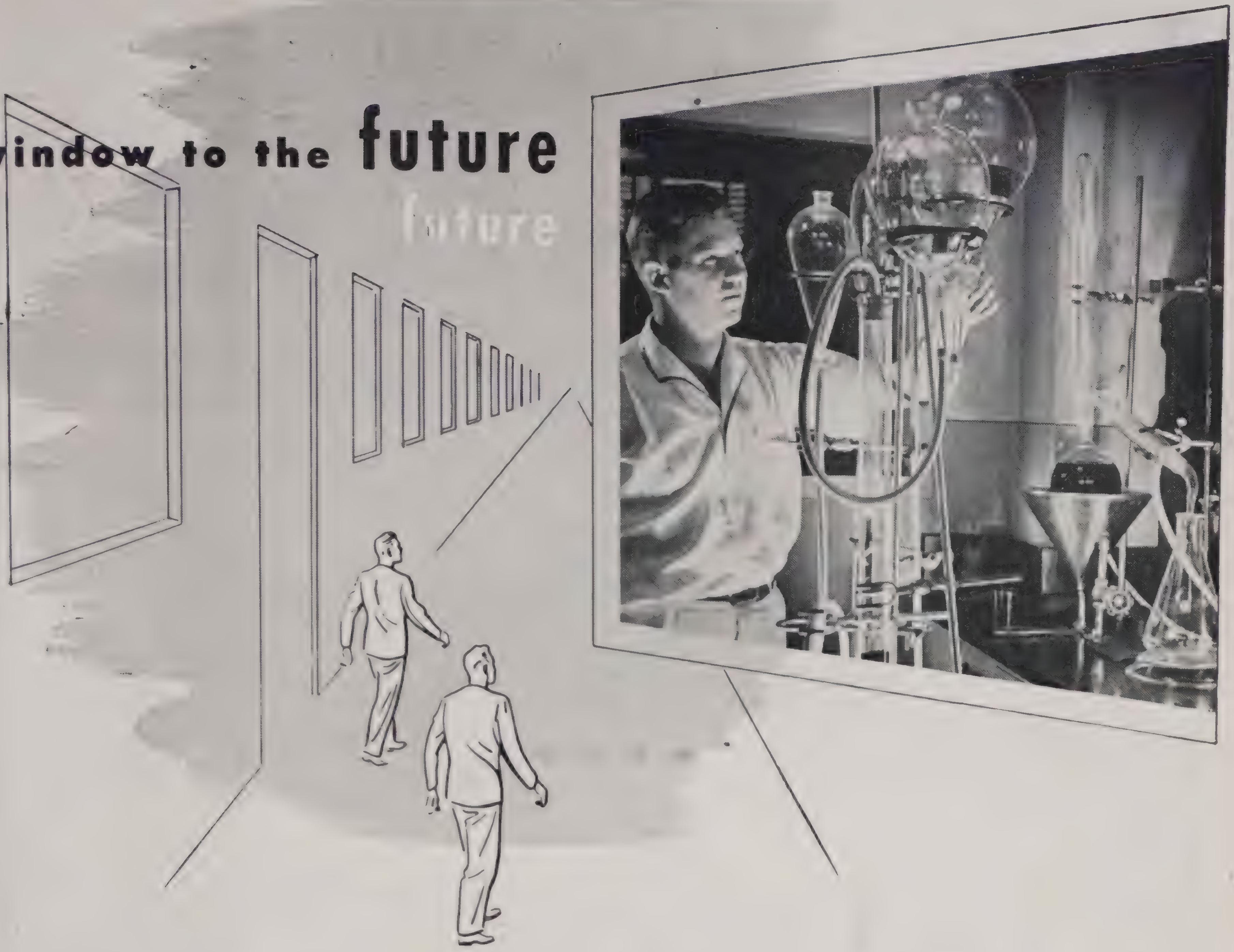
This is our patented, heat-sealed closure which gives up to 20% greater protection.

*Trade Mark Reg. U. S. Pat. Off.

Benj C Betner Co DEVON, PA.

CAMP BETNER CORP., Richmond, Va.; BENJ. C. BETNER CO. of WISCONSIN, Appleton, Wisconsin; SOUTHERN PACKAGING CORPORATION, Affiliate of Benj. C. Betner Co., High Point, N.C.; BENJ. C. BETNER CO., Paris, Texas; BENJ. C. BETNER CO. of CALIFORNIA, Los Angeles, California.

A complete bag service—from idea to finished bag to machinery for closing coffee bags and filling and closing liner bags for cartons.



window to the future

● Down this Pfizer corridor walk scientists with ideas for the future. Look through the laboratory windows on either side. Here you will see a better way of life emerging . . . now slowly . . . now with giant strides.

It has been Pfizer's aim to attract scientific talent and then to provide the vital environment – spotless laboratories, completely equipped, where these minds can freely create marvels for mankind which will transcend our present way of life.

Overshadowing research in size and personnel, but not in importance, are Pfizer's three efficient industrial plants. With the guidance of skilled personnel, they are the means of mass-producing the technical harvest of the laboratory.

But the greatest contribution by far – linking past and present with the future – is Pfizer's pioneering tradition in chemistry. New frontiers await. On these frontiers the same principles which charted our past course will guide us in the future. Intangible these aims – intangible these principles, but they are as enduring as the Pyramids. **Now starting our second century, we pledge for the future:**

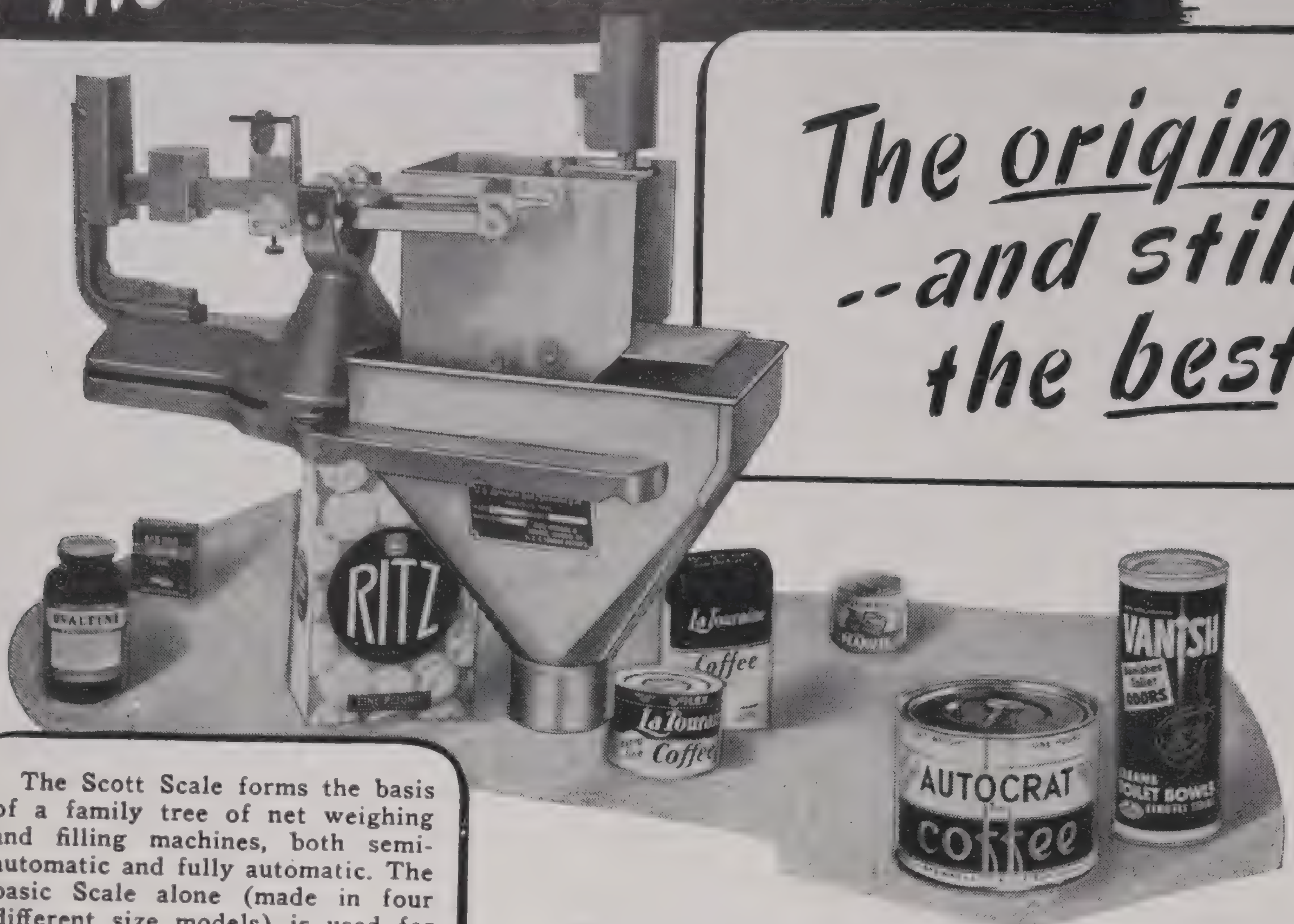
Quality Chemicals to Sustain, Nourish and Better Human Life

PFIZER

QUALITY FOR 100 YEARS

Chas. Pfizer & Co., Inc., 630 Flushing Avenue, Brooklyn 6, N. Y.; 425 N. Michigan Avenue,
Chicago 11, Ill.; 605 Third Street, San Francisco 7, Calif.

The SCOTT NET WEIGHER



The Scott Scale forms the basis of a family tree of net weighing and filling machines, both semi-automatic and fully automatic. The basic Scale alone (made in four different size models) is used for packaging free running items such as ground coffee, bean coffee, rice, barley, etc. To the Scale unit can be added one of our several models of Power Feeders, permitting the handling of a multitude of semi free flowing products such as Silex coffee, tea, nuts, candy, fine corn meal, lima beans, dog food, cut macaroni, cracker crumbs, etc. On a single dump unit, these products can be filled with closest accuracy at speeds up to 35/40 weighings per minute.

The semi-automatic Scale and Feeder unit becomes fully automatic in the Straight Line Weigher, and in our large Rotary Net Weighing Machines (the Models TU and TU-K), where single or duplex Scott Scale units form the basis of fast and accurate automatic weighing and filling.

Close to fifty years ago, the Scott Weigher was first manufactured by National Packaging Machinery Company, the original and only machine of its kind at that time, for continuous dump weighing and filling of coffee, tea, peas, beans and other food items. Today, under U. S. Automatic ownership, it is still made by the same company, by the same skilled craftsmen as in its early days. It is built to precision standards akin to watchmaking in their painstaking craftsmanship . . . the Scott has never sacrificed its fine workmanship to "corner cutting" production methods. To this we attribute the fact that the Scott today is the *fastest and most accurate single dump weigher in existence.*

Even now, we receive for overhauling Scott Weighers that were built 40 years ago, and which, when reconditioned and returned to the customers, operate like new.

The Scott Weigher has, of course, seen many changes with the years. It has been simplified and improved and its tripping mechanism is now solenoid actuated, which contribute to give it a smooth action with resulting speed and accuracy unequaled in the field.

Perhaps you'd like more information on what the Scott Weigher can do for your particular packaging needs. Won't you send us particulars on the types of products and containers you want to run, and the weight range and speed you require?

US

NET & GROSS WEIGHING ★ PACKAGE FORMING & FILLING ★ CARTON SEALING, LINING, WRAPPING ★ BOX MAKING

AUTOMATIC BOX MACHINERY CO., INC.

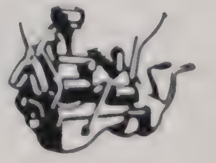
Owning and Operating NATIONAL PACKAGING MACHINERY CO. ★ CARTONING MACHINERY CORP.

69 ARBORETUM ROAD, ROSLINDALE, BOSTON 31, MASS.

Branch Offices: New York ★ Cleveland ★ Chicago ★ San Francisco (Mailler Searles, Inc.)

FOOD INDUSTRIES -- BUY DODGE - save money

SAVE . . . with these many money-saving features



ENGINES . . . of famous Dodge L-head design save gas, oil, service expense. Full-pressure lubrication, full-length cylinder cooling, and replaceable prefitted main bearings reduce upkeep, prolong life.

CHASSIS . . . Super-friction clutches, with extra large frictional area; rugged 3-, 4- and 5-speed transmissions; full-floating, hypoid rear axles give better performance, insure longer life. Cross-type steering permits sharper turning, easier handling. Cyclebonded brake linings (no rivets) insure safer stops, prolong lining wear.

CABS . . . Adjustable "Air-O-Ride" seats. Roomy, wide-vision "Pilot-House" cabs, with rear quarter windows, extra-wide seats and "All-Weather" ventilation, insure maximum vision, comfort and safety.

You save money when you buy Dodge *"Job-Rated"* trucks!

There are two reasons for this:

1. Your truck has more money-saving features than any other make of truck built. Many of these are *exclusive* Dodge features.
2. Your *"Job-Rated"* truck is built to fit its job. And trucks that fit the job save on operating costs. They last longer!

Read (at left) a partial list of Dodge truck features that are important to you. Then—see your Dodge dealer for *all* the reasons why a Dodge *"Job-Rated"* truck (priced with the lowest) is the best truck investment you can make.

Priced with the lowest

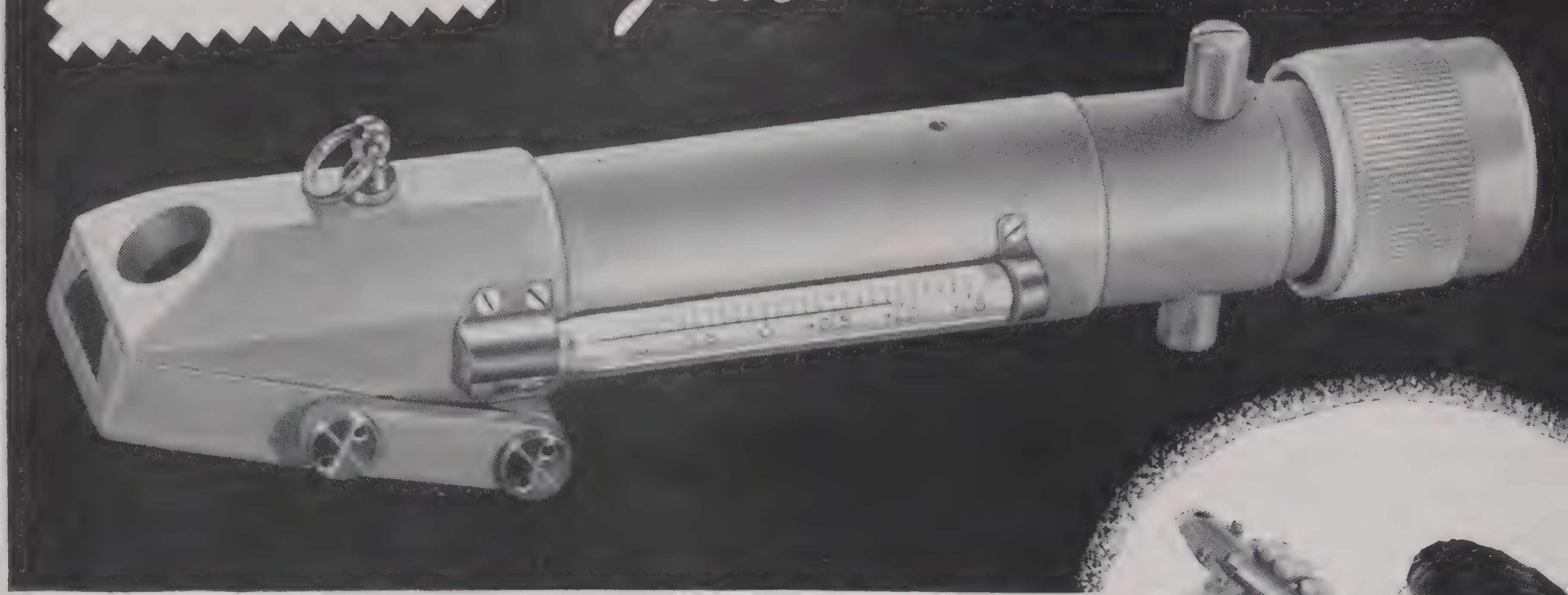
ST. LOUIS VINEGAR and CIDER CO.
ST. LOUIS VINEGAR and CIDER CO.
821 South 11th ST.
ST. LOUIS, MO.
ESTABLISHED 1878
CUSHING'S PICKLES
CUSHING'S VINEGAR
SWEET PEAS
SALAD DRESSING

For the good of *your* business—

Switch to DODGE "Job-Rated" TRUCKS

NEW

BAUSCH & LOMB *Juice* REFRACTOMETER



USES *BOTH* TRANSMITTED AND REFLECTED LIGHT

For the first time, a hand refractometer is now available that uses either reflected or transmitted light—transmitted light for clear, transparent solutions . . . reflected light for dense, opaque or turbid samples.

FOR QUICK, ACCURATE ANALYSIS of citrus or vegetable juices . . . for easy on-the-spot checking in the plant or in the field . . . the new Bausch & Lomb Juice Refractometer is an ideal instrument.

DIRECT READING with no interpolation necessary. A precise scale, from 0 to 25% total solids, provides for readings made directly with high accuracy. Scale lines alternate on each side of the center line, even tenths on one side, odd tenths on the other . . . avoiding a crowded scale.

WELL-DEFINED, COLORLESS DIVIDING LINE assures accurate readings, speed and convenience. Angles of prism faces, and the selective compensating filter mak the dividing line sharp. Self-seating cover preven damage to prisms.

FOCUSING EYEPIECE adjusts to accommodate i dividual user's eyes. Combined with an easy-to-rea internal scale, this helps eliminate guesswork i routine refractometric observation. Wide apertu gives complete unobstructed view of entire scale an borderline.

WRITE for complete information and demonstratio of the new B&L Juice Refractometer. Bausch & Lom Optical Co., 603-I St. Paul St., Rochester 2, N. Y.

BAUSCH & LOMB *Juice* REFRACTOMETE

WHAT FOOD-PROCESSING JOB WOULD YOU LIKE TO DO *FASTER*—*BETTER*— AT LESS COST?

Whatever it is, chances are that Rohm & Haas Commercial Enzymes can help you. For more than 40 years these versatile biocatalysts have been production expediters, quality and yield improvers, and cost cutters in scores of natural product processes.

For example:—Fruit Juices and Concentrates, Wines,
Jellies and Low Solids Gels, Baking,
Brewing, Distilling, Ice Cream, Whey,
Cheese, Meat, Protein Hydrolysates

Enzymes Make It Easy to...

Solubilize Starches *or convert them to sugar in peas, corn, wheat and other grains.*

Modify proteins—*or hydrolyze them—in meat, animal guts, casein, lactalbumin or legumes.*

Hydrolize pectins *in fruits, fruit juices or concentrates, and wines.*

Enzymes are short-cuts to better processing. No one knows their *full* potentialities, but our 40 years experience and research have taught us much that we shall be glad to pass on to you. Write today for your test sample of Rohm & Haas Commercial Enzymes. Test them in your processing. Then make a note to discuss your specific problem with our technically trained representative—or, if you wish, phone or write us direct. No obligation, of course.

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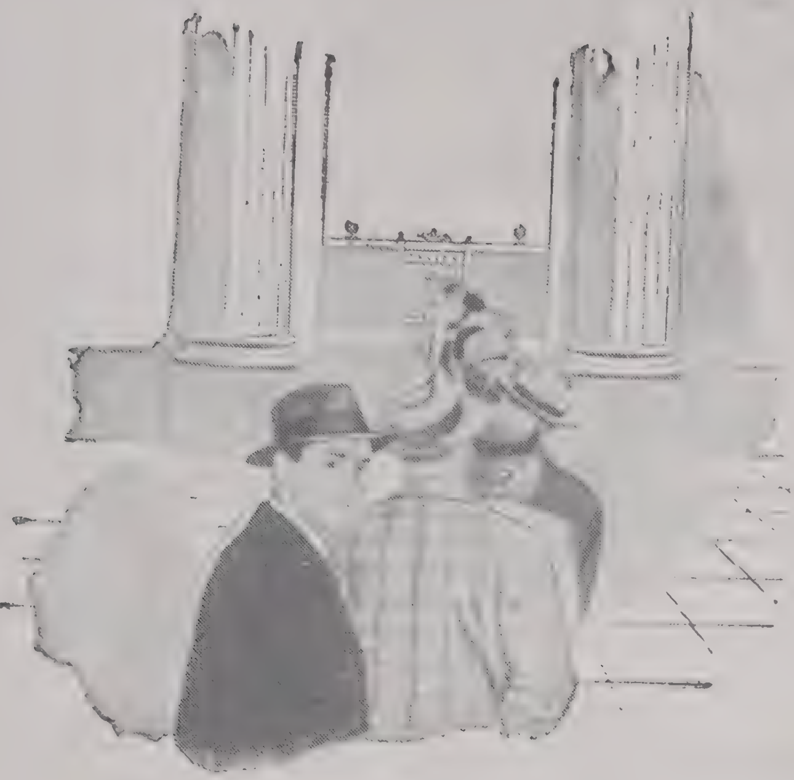

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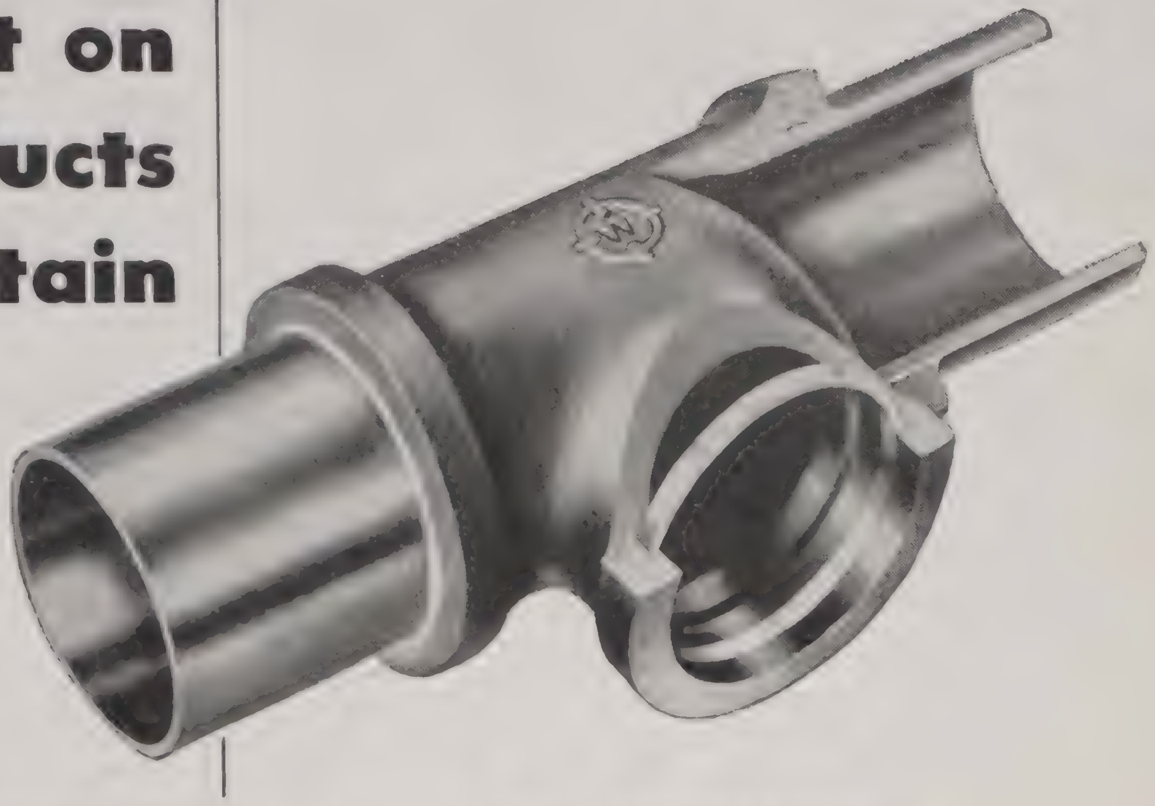

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Today, contractors . . . builders . . . architects are using brazed connections, in ever increasing numbers on their brass and copper pipe runs. However, they must be certain that the correct brazing alloy is used; that the joint has penetration of alloy up the shoulder of the fitting.

That's why more and more are turning to Silbraz® joints made with Walseal valves, fittings and flanges which assure the proper amount of alloy with no waste. They know that the finished joint not only will withstand hydrostatic pressure, but it will also withstand terrific impact and vibration – in fact, no correctly made Silbraz joint has ever been known to creep or pull apart under any pressure, shock, vibration or temperature which the pipe itself can withstand.

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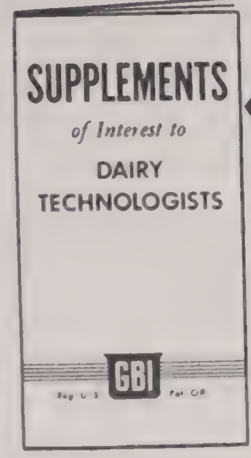

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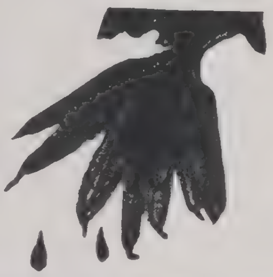

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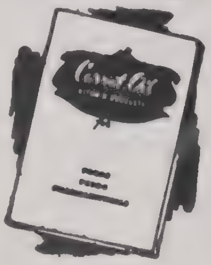

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Open Weave Construction—*Permitting free air circulation. Free drainage.*

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Simplicity of Design—*Easily made endless; readily repaired in case of accidental damage.*

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FOOD CHEMIST, thorough experience manufacturing many food products, flavors, supplies and specialties used by bakers, confectioners, candy makers, bottlers, grocers, hotels, restaurants, etc. Able to handle entire production. Desires position in or around N. Y. C. PW-9464, Food Industries.

WANTED: FOOD Chemist and Technologist Masters Degree 8 years experience in production, development, research. Supervised laboratory. Familiar with all food products. PW-9783, Food Industries.

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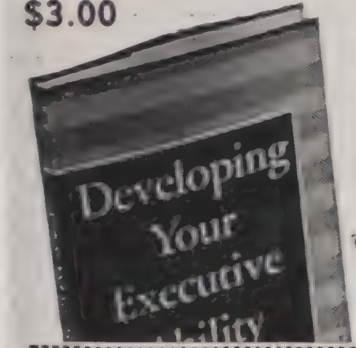

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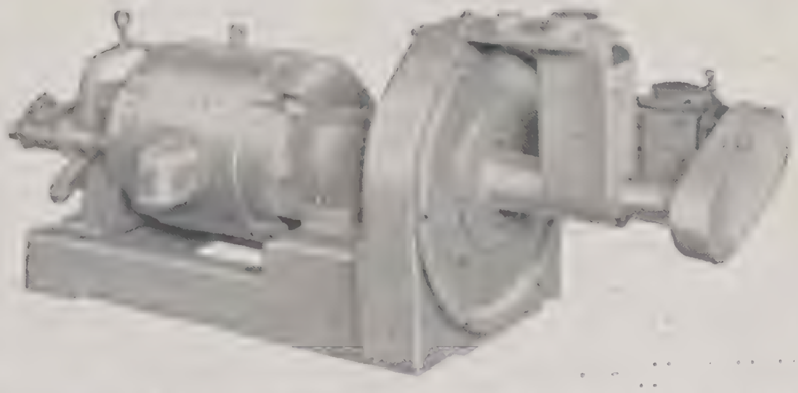

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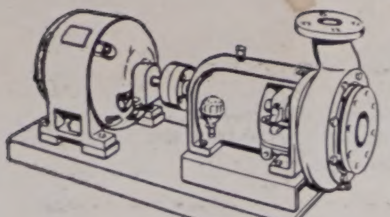

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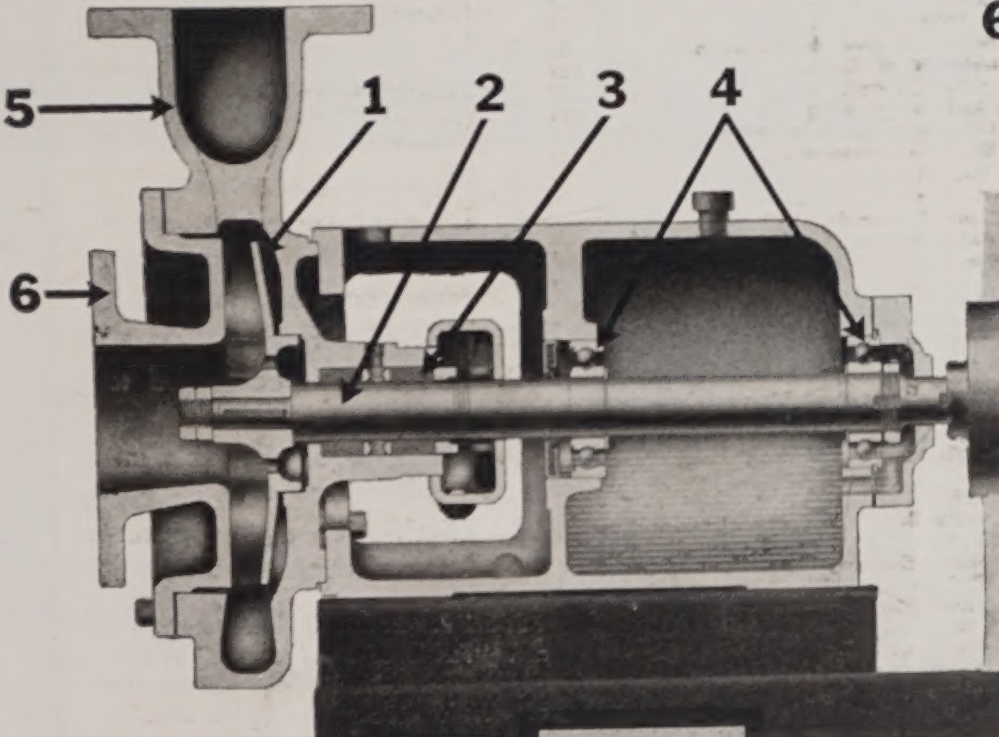

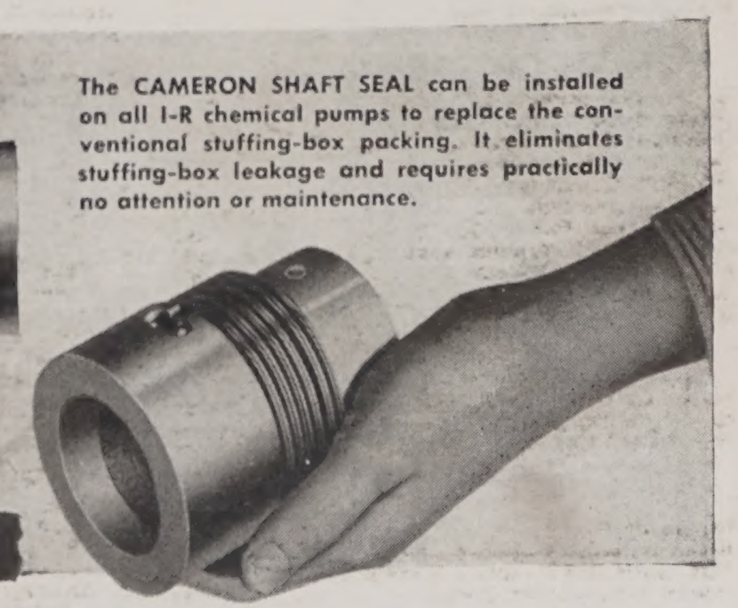

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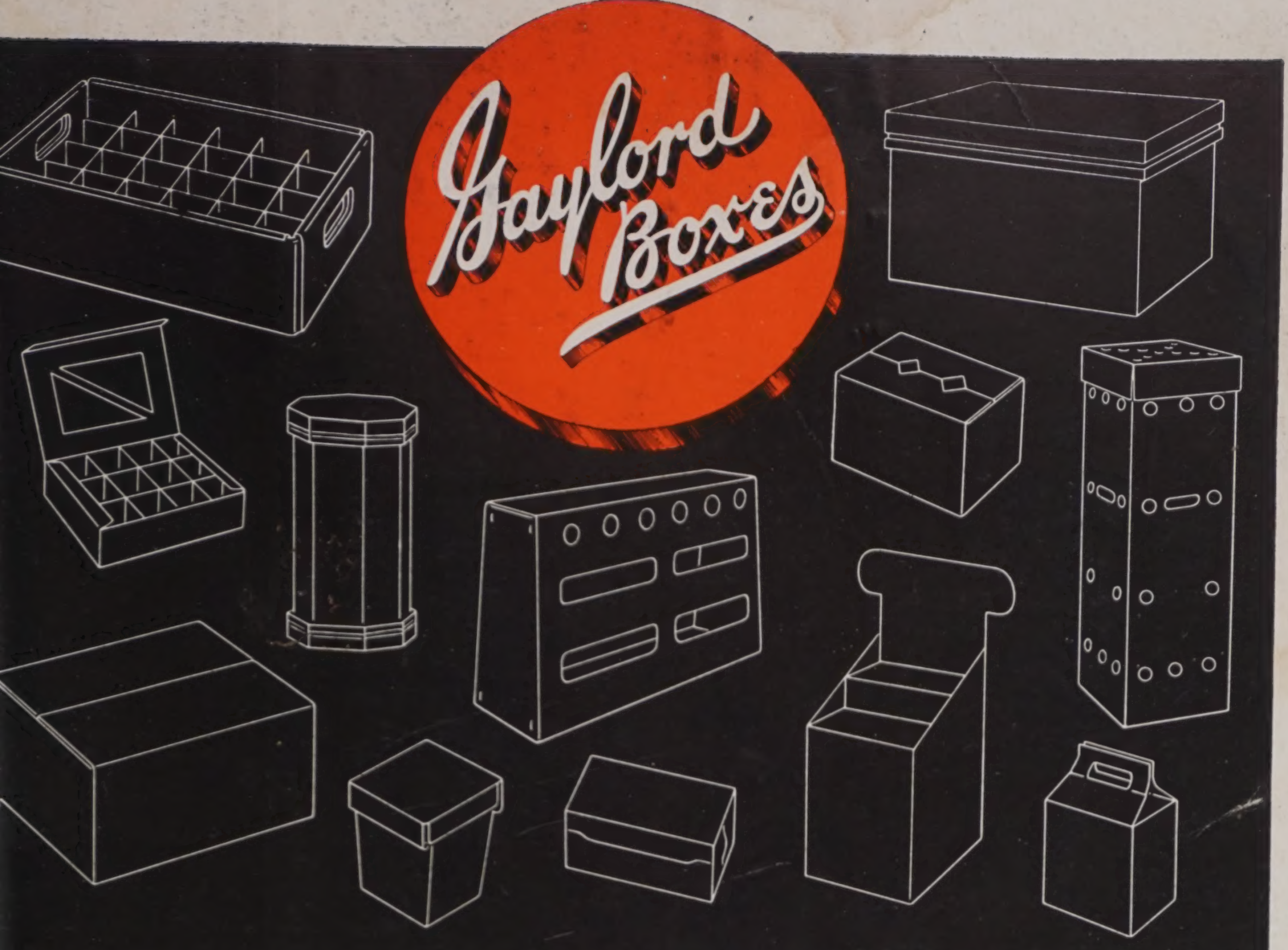

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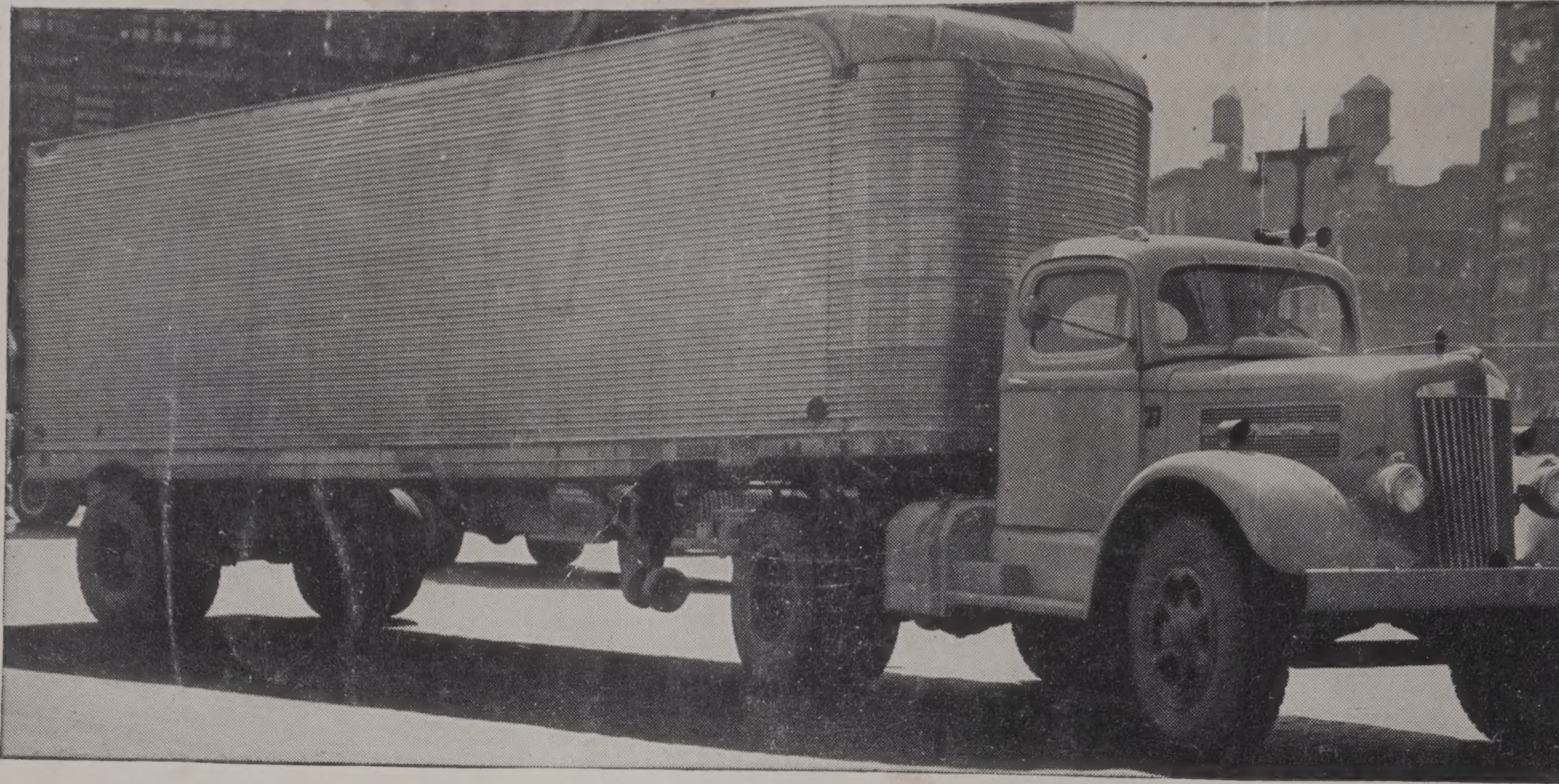
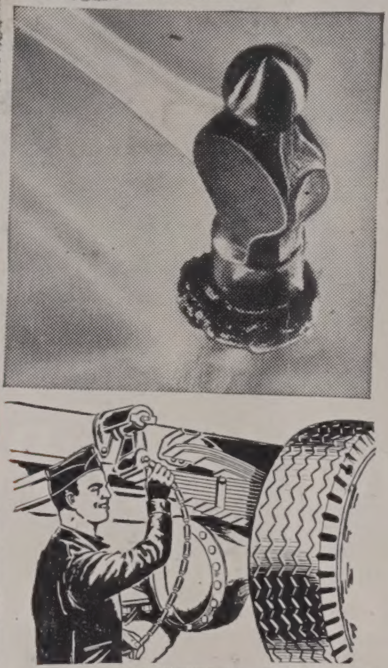


STOP LOOK LESSEN

maintenance costs



HIT IT! *Marfak* wo
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applications.

Texaco Marfak assures longer life for all chassis parts.

Texaco Marfak is the longer-lasting, chassis lubricant that *stays on the job.* Heavy loads and rough service won't squeeze or jar it out of bearings. *Texaco Marfak* seals against abrasive dirt, keeps rust-forming moisture off metal. Parts last longer, maintenance costs less.

In wheel bearings, use *Texaco Marfak Heavy Duty.* It provides fluid lubrication inside the bearing, but retains its original consistency at the edges . . . sealing itself in (assuring safer braking!), sealing out dirt and moisture. Protects against rust, too. No seasonal change is required.

For lower *engine* maintenance costs, lu
cate with *Texaco D-303 Motor Oil.* It is
detergent and dispersive, keeps eng
clean—thus reduces wear, assures b
performance and longer life for all en
parts.

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